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VOLUME V

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PRESCOTT, William Hickling, noted historian, born in Salem, Mass., May 4, 1796; died in Boston, Mass., Jan. 28, 1859. He was a



WILLIAM H. PRESCOTT.

grandson of William Prescott (1726-1795), an American Revolutionary officer, and in 1814 graduated from Harvard University. An accident while playing at college resulted in the loss of his left eye. His other eye, being sympathetically affected, caused him considerable inconvenience for many

years, until in the later part of his life he was almost totally deprived of sight. He entered his father's office as a law student shortly after graduating, but soon decided to engage in literary work and made an extended tour in Europe, visiting France, England, Germany, and Italy. In 1820 he married Susan Amory and henceforth devoted his entire attention to profound study of history, which he conducted by the aid of secretaries.

The first writings of Prescott were published in the North American Review and consisted of essays and criticisms, but his study was devoted largely to Italian literature. In 1826 he began the study of Spanish history and, after laboring ten years, completed the "History of Ferdinand and Isabella," a work translated immediately into German, Spanish, and Italian. His next great work was the "History of the Conquest of Mexico," which he commenced in 1838 and completed in five years. In 1847 he published his "Conquest of Peru" and in 1855 issued two volumes of the "History of the Reign of Philip II., King of Spain." All the writings of Prescott sustained the interest aroused by his first attempts. He was a thorough scholar and an elegant writer, and was both methodical and persevering in his pursuits. His style is vigorous and interesting and his life stands as a splendid example of industry and perseverance in the endeavor to accomplish a laudable enterprise. Among his writings not mentioned above are "The Poetry and Romance of the Italians," "English Literature of the Nineteenth Century," "Critical and Historical Essays," "View of the Ancient Mexican Civilization," "Life of Hernando Cortez," "View of the Civilization of the Incas," and "Essay on

PRESCRIPTION (pre-skrip'shun), the right title acquired by possession, either to personal or real property. It is the natural rule of the law that a person who has been for a long time in possession of property shall be regarded as the owner of it. This rule originated

from the fact that men are naturally inclined not to give up what belongs to them, and from the additional circumstance that it would be unreasonable without proof that the possessor is a usurper. Formerly a right acquired by possession was based upon immemorial adjoinment, but finally the term was shortened by statute to sixty years and ultimately to twenty years, which is now the time required to acquire tile by possession in most subdivisions of Great Britain and the United States.

PRESIDENT (prez'i-dent), the chief magistrate of a republic. This is the official title of the supreme executive officer of the United States. Presidents are elective, either by direct vote or through an electoral college, and serve for a definite term of years. The term of office of the president of Mexico and that of most of the South American republics is four years; of the French republic, seven years; and of the Swiss Confederation, one year. The term president was first used in America by William Penn, who proposed a scheme for the general government of the colonies, in 1696, and gave its chief executive that title. Albany convention proposed that of presidentgeneral, and the Continental Congress chose a presiding officer termed president. No such officer as a President of the United States was provided for under the Articles of Confederation, but there was an executive committee of thirteen, one from each State. They had no power except during the recess of Congress, since that body possessed the executive power while it was in session. The constitutional convention of 1787 decided that there should be a single executive, to whom the title of President was given. The duty of the Executive Department is to see that the laws are faithfully and promptly executed, hence the efficiency of the President is one indispensable characteristic in the attainment of good government.

The term of office of the President is four years and he may be reëlected from time to time, although public sentiment has operated against more than one reëlection. The ten presidents chosen for two terms include Washington, Jefferson, Madison, Monroe, Jackson, Lincoln, Grant, Cleveland, McKinley, and Wilson; Cleveland did not succeed himself in the presidential office. Five vice presidents succeeded to the Presidency on account of the death of the presidents. The chief executives who died in office are William H. Harrison, who was succeeded by John Tyler in 1841; Zachary Taylor, by Millard Fillmore in 1850; Abraham Lincoln, by Andrew Johnson in 1865; James A. Garfield, by Chester A. Arthur in 1881; and William Mc-Kinley, by Theodore Roosevelt in 1901. The Constitution provides that the President shall be a natural born citizen and shall have resided at least fourteen years within the United States. The age of eligibility is 35 years and the salary is \$75,000 per year. It is specially provided that the President shall not receive any other emolument during his incumbency from any State or from the United States.

Among the duties of the President are the conclusion of treaties with the advice and consent of the Senate, and, under the approval of that body, to appoint cabinet officers, ambassadors, ministers, consuls, and first, second, and third-class postmasters, and to grant reprieves and pardons, except in cases of impeachment. He may require in writing the opinion of any cabinet officer in relation to the duties of his respective office, and has the power to veto any bill passed by Congress, though a measure may become a law without his signature, if two-thirds of the members of each house vote to pass the bill over his veto. The President has appointive power with the consent of the Senate of judges of the Supreme Court, and all other officers of the United States whose appointments are not otherwise provided for.

Seven presidential cabinet officers may succeed to the Presidency in case of the death or removal by impeachment of both the President and Vice President. The order of succession is as follows: Secretary of State, Secretary of the Treasury, Secretary of War, Attorney-General, Postmaster-General, Secretary of the Navy, and Secretary of the Interior. The Secretary of Agriculture and the Secretary of Commerce and Labor cannot succeed to the Presidency for the reason that their positions were made cabinet offices after the passage of the succession law. Up to the ratification of the twelfth amendment, in 1804, the President and Vice President were not separately voted for in the electoral college, but the one obtaining the highest number of votes became President and the second highest, Vice President. Thomas Jefferson and J. Q. Adams were elected President by the House of Representatives, and Richard M. Johnson was chosen Vice President by the Senate in 1837.

The election of presidential electors occurs every fourth year, the first election occurring in 1788, and is held on the Tuesday after the first Monday in November in all the states. The electors chosen meet in the capitals of their respective states on the second Monday in January following their elections to cast their votes for President and Vice President. From each State the votes are certified to the president of the Senate, who counts them on the second Wednesday in February in the presence of both houses of Congress, and the newly chosen President and Vice President are inaugurated on the 4th of March thereafter. See Electors; United

PRESS, the newspapers or periodical literature of the country taken collectively. The liberty of the press has been regarded a matter of supreme importance by modern writers. Contentions regarding the freedom to utter and argue according to conscience prevailed for

many centuries. However, the freedom of speech was long restricted to narrow limits in many European countries, where it is still abridged more or less for political or other reasons. Originally the Constitution of the United States made no provision regarding liberty of the press, it being regulated by the states according to the established opinion of the people. In 1776 the states of Pennsylvania, Maryland, Delaware, and North Carolina adopted constitutions containing the earliest declarations in favor of the liberty of the press, and the first Congress passed an amendment to the Constitution providing that Congress shall make no law abridging the freedom of speech and of the press. In general, all citizens are held responsible for abuses and are liable for damages or to a fine in case they willfully and unjustly assail the character or motives of any citizen or alien. The British established a strict press-censorship over the colonies in 1637. However, it is now the policy of all nations to supervise more or less the publication of matters during the time of war. See Printing.

PRESQUE ISLE, a city of Aroostook County, Me., 42 miles northwest of Houlton, on the Canadian Pacific and other railroads. It is surrounded by a country which produces lumber, hay, potatoes, and dairy products. The features include the high school, public library, and State Normal School. It was incorporated

in 1859. Population. 1910, 5,179.

PRESS ASSOCIATION. See Journalism. PRESSBURG (pres'boorg), or Presburg, a city of Hungary, on the Danube River, 35 miles east of Vienna. It has a beautiful location on a range of hills belonging to the Little Carpathians, is well provided with railroad and steamboat facilities, and is the seat of an important commercial trade. Formerly the kings of Hungary were crowned in Pressburg and the city still contains the remains of a once beautiful royal palace. It has a cathedral of Gothic construction, a fine Franciscan church, numerous educational institutions, and several hospitals, parks, libraries, and monuments. Among the manufactures are woolen and silk goods, tobacco products, paper, leather, chemicals, starch, confectionery, machinery, and ironware. It has electric lights, street pavements, and other municipal facilities. It was the capital of Hungary from 1541 to 1784, but in the latter year Buda was made the capital by Emperor Joseph. German is the prevalent language and the inhabitants include about 7,000 Jews. Population, 1916, 86,768.

PRESTON (pres'tun), a city of England, in Lancashire, near the estuary of the Rible River, 21 miles northeast of Liverpool. It has communication by steam and electric railways. The place is well platted and is surrounded with pleasing scenery. Among the most noteworthy buildings are the Gothic townhall, an exchange, several county buildings, and numerous churches, schools, and charitable institutions. It has a

free public library, an institution for the blind, and three large parks. Among the manufactures are spirituous liquors, cordage, brass fixures, ironware, leather, clothing, and machinery. It is noted as one of the centers of linen and cotton manufacturing of England. The harbor has been improved materially. Preston has a large export trade in coal and imports of iron, corn, and timber. Population, 1911, 117,113.

PRESTWICH (prest'wich), Sir Joseph, geologist, born near London, England, March 12, 1812; died June 23, 1896. He studied at Reading and the London University College, and, after engaging for some time in commercial enterprises, he became devoted to a scientific career. His researches were made largely while connected with trade expeditions, and by means of them much knowledge was added to the fund of information in regard to the island possessions of Great Britain. He published, in 1851, his "Geological Inquiry Respecting the Water-Bearing Strata Around London," a work that remains a standard authority on the subject. In 1853 he became a member of the Royal Society. He was made president of the Geological Society in 1870, and while holding that position made several addresses relative to researches in the sea. He became professor of geology at Oxford in 1874, but retired in 1888 to devote his time exclusively to geological research. His writings include "Physical and Chemical Geology" and "Evidences of a Submergence of Western Europe at the Close of the Glacial Period." Queen Victoria knighted him in 1896.

PRETORIA (prê-tō'rĭ-à), a city of South Africa, capital of the Transvaal Colony, so named from Pretorius, an influential Boer leader. The place is on an elevated plain, on the southern slope of the Magalies Berge, 35 miles northeast of Johannesburg. It is connected by railway with Delagoa Bay, Johannesburg, Bloemfontein, Kroonstad, and Port Elizabeth. The country surrounding it is fertile, producing tobacco, wheat, sugar cane, cotton, coffee, indigo, fruits, and vegetables. Among the noteworthy buildings are those erected by the government, numerous churches, several gymnasia and high schools, and many fine residences. The streets are well paved and it has sanitary sewerage, telephones, waterworks, and other facilities. It was founded in 1855. The president of the Transvaal republic had his official residence at Pretoria. It surrendered to the British in 1900, after which the fort was dismantled. Population, 1911, 48,609.

PREVAILING WINDS. See Wind. PRÉVOST (prå-vo'), Eugène Marcel, novelist, born in Paris, France, May 1, 1862. After studying in a Jesuit academy and the Polytechnical School, he engaged in manufacturing tobacco. In the meantime he published "Le Scorpion," a story written adversely to Jesuit edu-

cation, and in 1891 he entered the literary field. His writings are numerous and deal largely with educational and social questions. Among his chief works are "Notre compagne," "Le moulin de Nazareth," "Le jardin secret," "Nouvelle lettres de femmes," and "Cousine Laura."

PREVOST (pre-vo'), Sir George, soldier, born in New York City, May 9, 1767; died Jan. 5, 1816. He entered the British army in 1783. was made captain, and for some time served in the West Indies. In 1808 he was made Governor of Nova Scotia and was promoted to be administrator in Canada in 1811. The following year he succeeded Sir James Craig as Governor-General of British North America, which position he held throughout the War of 1812. In 1813 he undertook an unsuccessful attack upon Sacketts Harbor, N. Y., and the next year made an attempt to reduce Plattsburg, on Lake Champlain, where he was defeated by the Americans under Macomb. The British called him before a court-martial for his lack of enterprise, but he died before a verdict was reached.

PREYER (prī'er), Wilhelm Thierry, German physiologist, born in Manchester, England, July 4, 1841. He was liberally educated at Bonn, Berlin, Heidelberg, Vienna, and Paris. In 1867 he became professor of physiology at Jena, where he labored successfully for many years, and attained a reputation as one of the most eminent scholars of modern times. He formulated a theory of sleep and announced some new discoveries in regard to spectrum analysis. Among his writings are "The Struggle for Life," "Blood Crystals," "Physiology of the Embryo,"

and "Hypnotism."

PRIAM (prī'ăm), in Greek legends, the King of Troy in the period of the Trojan War. He was the son of Laomedon and originally was named Podarces, but this was changed to Priam, which signifies the ransomed one, because he was saved from imprisonment and death by his sister, Hesione, after having fallen into the hands of Hercules. He married Hecuba, daughter of Dymas, King of Thrace, and among his renowned children were the prophetess Cassandra, the valiant Hector, and Paris, who caused the Trojan War. The city of Troy was under his government at the time of the famous Trojan War, which was caused by Paris carrying away Helen, but could have been prevented if he had restored her to the Grecians. His capital was destroyed after a siege of ten years, and he was killed by the hand of Neoptolemus while lying prostrate before the altar of Zeus, praying for divine assistance in the awful hour of peril. Homer does not mention his death, but it is recounted in the writings of Virgil and Euripides.

PRIBILOF (prē-bė-lŏf'), or Pribylov, the name of a group of islands in the Bering Sea, 200 miles northwest of Unalaska, belonging to the United States. The group has an area of 170 square miles. Saint George, Saint Paul and

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Walrus are the largest islands of the group. Dense fogs surround them much of the time. They are valuable for the sea fisheries. Population, 1918, 400.

PRICE, Sterling, soldier, born in Prince Edward County, Virginia, Sept. 11, 1809; died Sept. 29, 1867. He studied at Hampton-Sidney College and removed to Missouri in 1831, where he served in the Legislature. In 1844 he was elected to Congress, became a volunteer in the Mexican War, and commanded at the Battle of Canada, in New Mexico. He was made military governor of Chihuahua, in 1847, and participated in the expedition of Kearney to California. In 1853 he was elected Governor of Missouri, was reëlected to the same office, and at the beginning of the Civil War joined the Confederacy. At first he made a strenuous effort to win Missouri from the Federals, who finally compelled him to retreat to Arkansas, and later he took part in the battles of Pea Ridge and Corinth. He invaded Missouri in 1864, advancing as far as Pilot Knob, but was compelled to retreat before Pleasanton and Curtis. Subsequent to the war he founded a colony in Mexico, but returned to Missouri after the downfall of Maximilian.

PRICHARD (prich'erd), James Cowles, physician and ethnologist, born in Ross, England, Feb. 11, 1786; died in London, England, Dec. 22, 1848. He was educated with much care in medicine and a number of modern languages, and secured an extensive training in history. His study was partly at the London Saint Thomas Hospital and at Edinburgh, Cambridge, and Oxford. In 1810 he located as a physician in Bristol, but was soon after appointed physician to the Bristol Infirmary. His first noted publication, "Researches into the Physical History of Mankind," appeared in 1813 and went through a number of revisions and translations. He published "The Eastern Origin of the Celtic Nations" in 1831, in which he compared the different dialects of the Celtic with the Teutonic, Sanskrit, and other languages. Other writings include "Analysis of Egyptian Mythology," "Diseases of the Nervous System," "Treatise on Insanity," and "Insanity in Relation to Jurisprudence."

PRICKLY ASH, a shrub or small tree which is native to North America. The plant is prickly and the smell of the leaves and bark resembles that of lemons. A stimulant useful in treating toothache and rheumatism is made from the bark, hence it is sometimes called toothache tree. Several species are found in the West Indies and the southern part of the United States.

PRICKLY PEAR, a plant native to North America. It is found along the Atlantic coast of the United States and in the Mississippi valley from Michigan to Arkansas. The species which are common to the region between Connecticut and Georgia are sometimes called *In*-

dian fig. They have a leafless, light green stem, produce pale yellow flowers, and bear an edible fruit an inch or more in length. The pulp of the fruit is juicy and has a sweetish but acid taste. The kindred species of the central Mississippi valley has larger flowers and fruit and a deep green stem. Several species of prickly pear have been introduced and are now propagated in European countries bordering on the Mediterranean and in China, Arabia, Persia, and Syria. The fruit is used extensively as food, but in some countries the plants attain a height of from five to eight feet and are useful as hedge plants. Several species of cacti are known as prickly pear. These plants are native to Mexico and the southwestern part of the United States. Several species have been improved for cultivation by Burbank, but in a wild state they are covered with spines.

PRIEST, a person ordained to fill religious offices and perform certain ceremonies. history of the priestly office is nearly coextensive with that of religion, having been recognized from a very early date. It is related that Cain and Abel offered their own sacrifices, but the priestly office was established soon after. At first it was vested in the heads of families only, as in the case of Abraham, Isaac, and Jacob, but a special priesthood was established under the Mosaic law, when the Levites, the successors of Levi, furnished the priests and the high priests. The idea of a priesthood gained ground in the early pagan and Brahman religions, but the state church-of China, which owes its systematization to Confucianism, has no special priesthood, though the priestly functions are exercised by the emperor and various state officers. The Greek, Armenian, and Roman churches maintain the title of priest, and they look upon ordination to this office as one of the sacraments. In the Roman Catholic church the priests are bound to celibacy, but the Greek Church and a number of the eastern branches permit the consecration of a married man as priest. Protestant churches look upon Christ as the real priest, who is held to be the only one who has the power of offering sacrifices for the people, and they regard the clergy as the teachers and servants of the church. While the clergy are divinely called and properly appointed, they are held to possess certain ecclesiastical rights and are to discharge certain duties. They derive these functions partly from divine and partly from human law. The word priest is retained by the Anglican and other Episcopal churches to denote the second order of clergy, ranking next to the bishops.

PRIESTLEY (prēst'lī), Joseph, philosopher and divine, born near Leeds, England, March 13, 1733; died Feb. 6, 1804. He studied Latin and Greek in a public school, and later spent three years at a Dissenter academy at Daventry, London. In 1755 he became minister of a small congregation in Suffolk, and in 1761 was ap-

pointed teacher of languages at the Dissenter academy of Warrington. While there he married and commenced his literary career. He formed the acquaintance of Benjamin Franklin, while on a visit at London, who supplied him with a number of books of service in his study and research. His first published work, History and Present State of Electricity," appeared in 1767. About the same time he published "Theory of Language and Universal Grammar" and a work entitled "Vision, Light, and Colors." The University of Edinburgh granted him a degree in 1766, and shortly after he became minister of the Mill Hill Chapel at Leeds.

Priestley was the first to discover oxygen, which he called dephlogisticated air, and announced his discovery in his work entitled "Experiments and Observations on Different Branches of Air," which appeared in 1774. Lord Shelburne appointed him librarian and literary companion about that time with a salary of \$750 a year, and he accompanied the earl on a tour of Europe in the latter part of 1774. Later he was chosen minister of a Dissenter congregation at Birmingham and became noted as a writer and speaker in favor of the French Revolution, which so excited public opinion that a mob set his house on fire and caused his library and manuscripts to be destroyed. was compensated for this outrage, but the award did not cover the loss. Priestley's advanced position upon scientific questions made him unpopular in England and in 1794 he came to the United States, settling at Northumberland, Pa., where his death occurred. Among his writings not already named are "Disquisitions Relating to Matter and Spirit," "Letters to Philosophical Unbelievers," "History of Early Opinions Concerning Christ," "Doctrine of Philosophical Necessity," "General History of the Christian Religon to the Fall of the Western Empire," "Institutes of Natural and Re-vealed Religion," and "Theory of the Human Mind." Priestley ranks high as an authoritative writer on scientific subjects, but his historical works on theology are not considered particularly valuable.

PRIM (prēm), Juan, Spanish soldier and statesman, born in Reus, Spain, Dec. 6, 1814; died Dec. 30, 1870. He was a son of Pablo Prim, a military officer of rank, and at an early age entered the military service. In 1837 he was appointed colonel in the regular army for distinguished services in support of the infant Queen Isabella, and, when the Espartero ministry was overthrown, in 1843, he was made general and created Count of Reus. The democratic rising that followed soon after at Barcelona caused the government to appoint him to restore order, but his dilatory course was the cause of his dismissal. He was accused of being implicated in the assassination of Narvaez, president of the council, in 1844, but his sentence to six years' imprisonment was revoked by the queen the following year.

Prim entered the senate in 1858 and the following year commanded the Spanish reserve in the war against Morocco. In 1861 he secured command of the Spanish contingent and was sent to command the Spanish army in Mexico, but soon withdrew his forces, a course afterward approved by the Cortes of Spain. He led an insurrectionary movement against Queen Isabella in 1866, but its failure required him to flee for safety. However, he continued to direct the movements of the insurgents from Brussels until Queen Isabella was overthrown in 1868, and soon after he was appointed to the rank of marshal, thus becoming dictator of Spain. He offered the Spanish crown to Prince Leopold of Hohenzollern in 1870, which became the pretext for Napoleon III. to declare war against Germany. However, Leopold declined the proffered throne of Spain, and Prim induced the Italian prince, Amadeus, to accept it. Prim was wounded by an assassin on the day Amadeus landed in Spain and died two days later.

PRIMATES (pri-ma'tez), the highest order of mammals, including man, the lemures, and the apes and monkeys. They are distinguished by having fore as well as hind limbs, which are capable of freer movement than similar limbs in ordinary quadrupeds in which the joints are formed so as to admit of less freedom of motion. Each limb in the primates has five digits, which are protected by flat nails instead of claws, and the fore limbs are grasping hands. Man and the anthropoid apes are similar in having nostrils close together and opening downward, while the chimpanzees and a few others are closely related to man in structure, especially in the form of the brain and the form and size of the bones. The gorilla, though approaching man in size, has a much smaller brain, especially the cerebrum, which is less than half as large as that of man. Other differences include modification in the size and form of the limbs, an erect posture in walking, and the exercise of the reasoning faculties. Although the gorilla and allied animals appear to have the faculty of communicating, man alone

possesses articulate speech.

PRIME, Samuel Irenaeus, clergyman and editor, born in Ballston, N. Y., Nov. 4, 1812; died at Manchester, N. H., July 18, 1885. He graduated from Williams College in 1829, studied theology at Princeton, and in 1833 was called to the Presbyterian ministry. In 1840 he was required to discontinue pastoral work on account of feeble health, and from that time until his death he edited the New York Observer. He traveled in Europe several years and became famous for his Irenaeus Letters. In the meantime he contributed many valuable articles to Harper's Magazine. Prime made large donations to several benevolent societies

and was officially connected with Williams College. Among his writings are "Travels in Europe and the East," "The Power of Prayer,"

and "Old White Meeting House."

PRIME, William Cowper, journalist, born in Cambridge, N. Y., Oct. 3, 1825; died Feb. 13, 1905. In 1843 he graduated at Princeton College, was soon after admitted to the bar, and practiced law in New York City from 1846 to 1861. In the latter year he became editor of the New York Journal of Commerce, but discontinued the newspaper business after eight years and made an extensive tour of Palestine and Egypt. In 1884 he became professor of the history of art at Princeton College and subsequently devoted much time to literary work. For some time he was first vice president of the Metropolitan Museum of Art in New York City. Among his publications are "Tent Life of the Holy Land," "Owl Creek Letters," "Boat Life in Egypt and Nubia," "Pottery and Porcelain of All Times and Nations," and "The Holy Cross."

PRIMOGENITURE (prī-mō-jĕn'ī-tūr), in law, the rule which confers a dignity or estate in land on a person by virtue of his being the eldest male of those who could inherit. It was recognized as a common feature in many of the ancient systems of law, but now the custom of primogeniture is not maintained to any great extent. Up to the time of the Norman conquests all sons inherited alike, but at that time the institution was established, although it was limited to narrower channels from time to time until it finally disappeared. As a system it operates to pass the title in all the real estate of the father to the eldest son, who in turn succeeds to the whole estate. However, if there are no male heirs, then the daughters inherit jointly, though this is not the case with the crown, which becomes vested in the eldest daughter.

PRIMROSE (prim'rōz), an early flowering plant of the Alpine region of Europe and the temperate parts of Asia. Many species are cultivated in Canada and the United States.

PRINCE ALBERT, a city of Saskatchewan, about 200 miles northwest of Regina, on the North Saskatchewan River and on the Canadian Northern and Grand Trunk railroads. It has lumber and flour mills, brick yards, elevators, fishing and fur trading, and much shipping. The chief buildings include the high school, courthouse, Masonic Temple, and Empress Theater. It has a large local and jobbing trade. It was incorporated in 1885. Pop., 1911, 6,254.

PRINCE, the title applied to one who possesses royal honor or power, as the sovereign of a country. The term is used also in speaking of the sons of sovereign rulers, and the title of princess is applied to the daughters. In some countries a territorial addition is made to the title, as Prince of Orange, Prince of Wales, and Prince of Naples. The title is ap-

plied to a member of a high order of nobility, as in Germany, Holland, Belgium, and Italy, where it has reference to the rank immediately below duke, though in other countries it is used to designate a rank superior to that of duke. Many members of ancient families in Europe



1, Cowslip Primrose; 2, Alpine Primrose; A, Fruit.

bear the title of prince, though they are not immediately connected with a reigning house, but in England the term is applied only to members of the royal family.

PRINCE EDWARD ISLAND, a Province of the Dominion of Canada, situated in the southern part of the Gulf of Saint Lawrence. It comprises all of Prince Edward Island, which is separated from Nova Scotia and New Brunswick by Northumberland Strait. The length from southeast to northwest is 120 miles and the width ranges from four to 35 miles. The area is 2,133 square miles, hence the Province is the smallest member of the Dominion.

DESCRIPTION. The coast line is remarkably irregular, being indented by many gulfs, bays, and inlets. Cardigan Bay, on the eastern coast, and many others, afford deep and spacious anchorage for large vessels. Most of the coasts are precipitous cliffs of red sandstone, ranging from 20 to 100 feet, and the soil is made up largely of a sandy loam, inclining in many places to a reddish color. Although the surface is undulating and in places hilly, no part of the island is more than 500 feet above the sea.

The streams are influenced to a considerable extent by the tides, having comparatively wide estuaries as they enter the sea. Though the rivers are short, they furnish considerable water power. The summers are pleasant and the winters are less severe than in Nova Scotia, being influenced noticeably by the sea. All parts are remarkably healthful. Fine forests of hemlock, cedar, fir, spruce, pine, and the hard woods

formerly covered the island, but the timber area has been greatly reduced.

INDUSTRIES. Agriculture is the principal industry and fully two-thirds of the area is utilized for farming and grazing. Naturally the soil is highly fertile, but it has been injured through the cultivation of cereals for many years and natural manures obtained from the bays are used extensively. Oats, hay, wheat, potatoes, and turnips are the leading crops, but barley, rye, buckwheat, and garden vegetables are grown profitably. Dairy farming has developed to the condition of being an important enterprise. Cattle and horses are raised profit-

PRINCE EDWARD

ISLAND

GEORGETOWN

MAP OF PRINCE EDWARD ISLAND.

ably and the breeds grown are of a high class. Other domestic animals include sheep, swine, poultry, and silver foxes.

Fishing ranks second among the occupations. The catches include lobsters, hake, herring, cod, oysters, and mackerel. Oyster dredging is followed extensively. The fisheries yield products for canning and curing and in this form large quantities are exported. The other manufactures are principally for domestic use. They consist mainly of butter, cheese, earthenware, clothing, machinery, and lumber products. The mining industry is not developed to any great extent, but building stone and clays are found in paying quantities.

Communication is provided by a railway that extends the entire length of the island and oranches are operated to some of the more important maritime towns. The lines in operation, a total of 280 miles, were built and are still owned and operated by the government. Highways of a superior class are maintained in all parts of the island. Steamboat communication extends to the leading ports in Canada and the United States, but during the winter communication is much restricted, except with New Brunswick, with which vessels communicate the entire year.

GOVERNMENT. The colonial government is similar to that of the other provinces in the Dominion. Chief executive power is vested in the Lieutenant Governor, who is appointed by the Governor General of Canada, and is assisted by an executive council of eight members. The legislative assembly has but a single chamber, whose members are elected by a popular vote. The judicial department embraces an admiralty district court, a superior court, and several minor courts. For the purpose of local government it is divided into the three counties of Prince, Kings, and Queens.

A free school system was established in 1851.

The schools are undenominational and are administered by a superintendent and a council appointed by the government. They are supported partly by funds derived from government grants and partly by direct taxation. A well-organized high school with an advanced course of study is maintained at Charlottetown.

INHABITANTS. The density of population is fifty to the square mile, the highest for any Province in the Dominion. Most of the inhabitants are of British

origin. The Anglicans, Presbyterians, Methodists, Baptists, and Roman Catholics are well represented in the Province. Charlottetown, on Hillsborough inlet, is the capital and largest city. The principal towns include Summerside, Georgetown, and Alberton. Population, 1901, 103,259; in 1911, 93,728.

HISTORY. Prince Edward Island was discovered by Sebastian Cabot in 1497 and was claimed by Champlain for France in the early part of the 17th century. The Count of Saint Pierre secured a grant of it in 1719 and made an unsuccessful attempt to found colonies. It was seized by the British in 1745, but was restored to France by the Treaty of Aix-la-Chapelle. It was finally annexed by Great Britain and placed under the administration of Nova Scotia in 1758, but soon after a separate government was established for it. Canadian confederation was decided upon in 1864 at a conference held at Charlottetown, which resulted in the establishment of the Dominion in 1867, but Prince Edward Island did not enter the confederation until in 1873. The prohibition law, the income tax act, and the act providing for the general improvement of highways were enacted within recent years.

PRINCE OF WALES, the title conferred

Wales. It

was first con-

ferred to

please the

Welsh at the

time of the

conquest o f Wales, in 1284, by Ed-

ward I., on

his son, who

afterward be-

came Edward

was not borne

III., but he

conferred it

upon his son,

II.

bу

The title

Edward

upon the heir apparent to the throne of Great Britain, originally borne by the sovereigns of



GEORGE V.

Edward the George Frederick Ernest Albert. Black Prince, in 1343, and since that time it has been borne by the eldest son of the reigning sovereign. The title is bestowed by individual investment and is accompanied by the earldom of Chester, but the eldest son is by inheritance Duke of Cornwall, a title first conferred by John of Eltham, the last Earl of Cornwall, on Edward the Black Prince, in 1337. The Prince of Wales as heir to the crown of Scotland also bears the titles of Earl of Carrick, Duke of Rothesay, Lord of the Isles, Baron of Renfrew, and Prince and High Steward of Scotland. The late Prince of Wales, now George V., was born at Marlborough House, London, June 3, 1865. He received the title of Prince of Wales from his father, Edward VII., in 1901. In 1893 he married Princess Victoria Mary, of Teck. He succeeded his father as King of Great Britain and Emperor of India in 1910.

PRINCETON (prins'tun), a city in Indiana, county seat of Gibson County, 26 miles north of Evansville. It is on the Southern and the Evansville and Terre Haute railroads and is surrounded by a fertile agricultural region, which produces cereals and fruits. The principal buildings include the county courthouse, the public library, the high school, and a business college. Among the manufactures are flour, agricultural implements, and clothing. The city has regularly platted streets and good municipal facilities. It was settled in 1804 and incorporated in 1838. Population, 1910, 6,448.

PRINCETON, a borough of Mercer County, New Jersey, on the Delaware and Raritan Canal, 45 miles northeast of Philadelphia, Pa. It is on the Pennsylvania Railroad, has well improved streets, and is noted as the seat of Princeton University. Other features include the Princeton Theological Seminary, the Princeton Preparatory School, and many fine churches and residences. In 1777 Washington defeated the British forces at Princeton and the Continental Congress held its session here in 1783. Population, 1905, 6,029; in 1910, 5,136.

PRINCETON, Battle of, an engagement of the Revolutionary War, fought at Trenton, N. J., between the Americans under Washington and the British under Cornwallis. On Jan. 2, 1777, after the Battle of Trenton, the Americans took a position on the bank of the Assunpink River, where they were confronted by about 8,000 British. Washington was unable to cope with the superior force, hence resorted to strategy. Leaving a small force to keep the campfires burning and to make a noise, he moved with the larger part of his army around the British left and encountered their reënforcements at Princeton on the 3d. By thus cutting the British lines, he forced Cornwallis to retreat to New York, thus giving the Americans a clear field between Philadelphia and the Hudson. The Americans lost about 100, while the British loss was 200 killed and 300 prisoners.

PRINCETON UNIVERSITY, formerly the College of New Jersey, a celebrated educational institution, at Princeton, N. J. Though nonsectarian, it is closely allied to the Presbyterian denomination and is for men only. It was founded in 1746 by charter from John Hamilton, president of His Majesty's Council, and was established with the view of providing ample means for the intellectual and religious culture of those desiring a liberal education, but more especially for the training of candidates for the ministry. The institution was opened at Elizabeth in 1746 under the presidency of John Dickinson, who was succeeded on his death in the same year by the Rev. Aaron Burr. In 1748 it was removed to Newark, where it remained until 1757, when it was removed to Princeton, and Nassau Hall was erected and named in honor of William III. The Presbyterians united to support the college in 1766 and in 1812 established the Princeton Theological Seminary, an institution still unconnected with it. Nassau Hall is the oldest college building and is historic on account of being used as a barracks and hospital by the Americans and British at different times in the Revolution. In the Battle of Princeton, on Jan. 3, 1777, a cannon ball passed through the walls, and in 1783 it was the meeting place of the Continental Congress.

The second president of the college was the father of Aaron Burr, afterward Vice President of the United States, and other noted presidents include Jonathan Edwards and James Mc-Cosh. It was during the presidency of the latter that the institution reached its present importance, since it received endowments during his incumbency of twenty years which exceeded \$3,000,000. Within this period the departments of language and literature, philosophy, mathematics, and science were established on a firm basis. John C. Green, in 1873, made a liberal endowment to establish the departments of civil

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engineering, general science, and electrical engineering. The graduates from Princeton include some of the most eminent men of America, among them James Madison, fourth President of the United States. It has adequate and advanced courses of study, 107 endowed scholarships, a library of 300,000 volumes, 212 professors and instructors, and about 1,500 students. The periodicals include the Princeton Review, which was founded in 1825 and was edited by Charles Hodge until 1872, when it was united with the Presbyterian Quarterly, now published in New York.

PRINTING, the art of making matter for reading by means of type and the printing press on cloth, paper, or other material. It is frequently referred to as "the art preservative of arts," since it supplies the most efficient means of recording knowledge for the use of future

generations.

HISTORICAL. The Chinese were the first to use movable types in printing, and there is evidence that they cut classics upon tablets and made impressions with them as early as 175 A. D. Several of these classics are still extant, while records published in the 6th century are numerous. Printed books came into common use in China in the 10th century. It is remarkable that little progress has been made by the Chinese since they first used wooden blocks for making impressions, and their printing is done quite like it was originally. From 5,000 to 10,-000 movable characters are necessary, since each movable type represents a word instead of an elementary sound. Each character is supplied with ink by a brush and pressed upon the paper by the hand of the printer. In some of the larger offices forms are prepared and the printing is done by methods much like those employed in an old-style Washington hand press, while many of the books are printed from blocks on which each page is engraved by itself. In the 12th century blocks were used for ornamenting fabrics in Europe, while playing cards were printed from blocks in the 14th century, and movable type for printing was invented about the middle of the 15th century.

The credit of inventing movable type is claimed by some for Lourens Coster, of Haarlem, Holland, but others think the invention due to Johann Gutenberg, of Germany. It is probable that both made inventions about the same time, but the art was first practically applied by Gutenberg, who published an edition of the Bible in Latin about 1445. Those claiming the honor for Coster show specimens of printing found at Haarlem, but it is singular that none of the early printed matter contains the names of those associated with the productions. Gutenberg was located at Mentz and Strassburg and was supported financially by Johann Fust and Peter Schoeffer, who aided him in producing many of the earliest printed matters in the German. Soon after the art was carried to France, Austria, and Italy, and in 1471 William Caxton introduced printing into England by setting up a press in Westminster Abbey. A strict censorship was established in England over the printers in 1530, largely because of the influence exercised by Cardinal Wolsey and others prominently connected with the church. The censorship was discontinued in 1694, after long years of limitation and persecution, and literature and learning immediately experienced a remarkable revival.

Antonio de Mendoza, viceroy of Mexico, founded the first printing establishment in America in 1536, and 103 years later the first printing press was set up within the present territory of the United States, at Harvard College, in Cambridge, Mass. The first printing office at Philadelphia was founded in 1685 and at New York in 1693, but many other similar establishments were installed in rapid succession.

METHODS. Three distinct processes are employed in the modern methods of printing, known as composition, imposition or makeready, and press work. Composition, the first step in printing, consists of setting the type. This is done by the compositor, who stands before the case in selecting the individual types, which he sets up in a metal frame called the stick. About twelve lines are usually set in the stick, after which they are transferred to the galley, of which a proof is taken for the use of the proof reader, who indicates any errors in the work by pencil marks.

Imposition or make-ready is the process of forming pages of the type, which involves putting in page numbers, headlines, and running titles. This work is done on a table with a stone or iron top by a workman known as the stone man. After the pages are completed, each page is wedged into an iron frame or chase, when the frame and the type constitute the form. Page proofs are usually taken before the forms are completed, hence the pages are now ready for the printing press, or they are sent to the electrotypers, in case the printing is to be from plates. The printing is done on a printing press, which is propelled by hand,

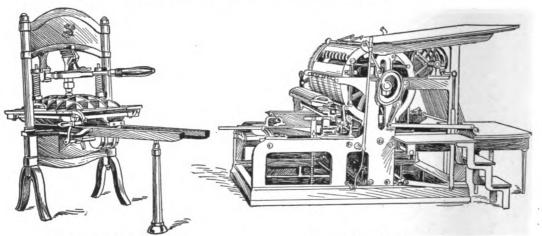
or by steam or electric power.

Formerly all the composition was done by hand as described above, but in the larger establishments much of the type now is set up by machinery. In setting type by machines a single operator is able to accomplish as much as from three to five persons working by hand, the difference depending upon skill and the kind of machine used. Many styles of typesetting machines have been invented, all of them being supplied with a keyboard, similar to a typewriter. They may be divided into three classes: those like the Simplex, setting the type; those like the Mergenthaler, setting matrixes and casting full lines to be used in printing; and those like the Monotype, casting and setting

type singly, instead of in a line. Improvements have likewise been made in the manufacture of printing presses until now 100,000 perfected sheets may be printed in an hour on a single machine, instead of a few dozen, as was the case when printing was first employed.

PRINTING PRESSES. The printing presses used up to the 17th century consisted of a contrivance whereby the form of types was run under a screw press. By turning the screw by hand, similar to the screw of a letter-copying press, the pressure was applied, and, after withdrawing the form, the printed paper was replaced by another sheet. William Jansen Blaen, of Amsterdam, invented a wooden press whereby it was possible to secure an impression by releasing a spring after placing the form of types in position, and this style of press continued in use until the latter part of the 18th century. The Earl of Stanhope improved the hand press in 1800 by inventing a mechanical device where-

made to propel a printing press by steam power. This machine had a capacity of 1,800 impressions per hour. Soon after completing this improvement, in 1814, he devised additions whereby the paper, after being printed on one side by a cylinder, was placed in position and printed by a second cylinder on the other side. Many valuable improvements followed in rapid succession. The first notable improvement made in the invention of rapid-printing machinery may be credited to Richard M. Hoe, of New York, who made a rotary press in 1847 that had a capacity of 20,000 papers per hour, but the impressions were made only on one side. Such machines as the Cranston press are now used in the medium class of newspaper offices. Sir Rowland Hill was the patentee of the first web perfecting press in 1835; that is, a press capable of printing from a continuous roll of paper on both sides and cutting and folding the sheets. Walter Scott, of Chicago, in 1879, de-



WASHINGTON HAND PRESS.

CRANSTON NEWSPAPER PRESS.

by pressure was secured through the action of levers, and in 1818 George Clymer, of Philadelphia, made other improvements. His press is known as the *Columbian* and the printing was done by bringing steel jaws together by means of a lever. It was operated by two men and had a capacity of about 180 impressions an hour. The *Washington press* was invented in 1829. It is used extensively in country printing offices, and undoubtedly possesses the highest degree of mechanical completeness possible to be put into a press to be operated only by hand. While not rapid, it does its work with much accuracy.

Modern rapidity in printing may be said to date from 1811, when Friedrich Koenig, a German printer, invented a cylinder press that had self-inking rollers and carried the paper on tapes through the machinery. He soon after improved the machine by adding the double cylinder and supplying the first apparatus ever

voted much attention to press improvements, and the Scott web perfecting press may be regarded as one of several combining all the newer features of the best machines now used.

Modern perfecting presses are mammoth machines and contain a multiplication of cylinders and forms in one general framework. The paper used is in one continuous roll, varying in length from three to ten miles, and is of the desired width for printing. It is placed on a rack at the end or above the press and is unrolled at any speed required by the machine. The paper is printed on both sides and cut, and is then folded and the forms are counted by the machine. The largest presses are fed by four rolls of paper, usually 63 inches in width, and the capacity of the most rapid is sufficient to turn out about 140,000 four-page papers in an hour. Among the best known perfecting presses are the Campbell, Walter, Potter, Goss, Hoe, Cottrell, and Bullock. Printing in the larger

GUTENBERG'S FIRST PROOF

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offices is done almost exclusively from stereotyped or electrotyped plates made after setting

the type by machines.

PRISM, a solid whose lateral faces are parallelograms and whose ends or bases form similar, equal, and parallel plane figures. The term is applied in optics to an instrument made of some transparent substance, as quartz, glass, or a prismatic glass case filled with transparent liquid. Such an instrument is usually of a form having equal and parallel triangular ends and whose three sides are bounded by three parallel lines, extending from the three angles of one end to the three angles of the other end. A ray of white light is bent twice from its course in the same direction in passing through such a prism, once on entering and once on leaving, and the different colors are separated so as to form a spectrum. An achromatic lens is one that transmits light without separating it into its constituent colors. Light may be achromatized by joining prisms or other refracting bodies which have opposite dispersing power.

PRISONERS OF WAR, the persons who are captured from the enemy in the time of war, whether in military or naval operations. Prisoners of war were anciently treated with great severity and those captured from the vanquished enemy were recognized as the property of the victors, who either reduced them to slavery or put them to torture and death. practice of putting to death nonparticipants came into disrepute with the advance of civilization, but for many centuries all those claiming allegiance to the enemy were reduced to serfdom or slavery, and were either employed by the successful nation or sold into bondage to friendly states. It was the common practice in Greece for centuries to destroy the adult male population of the enemy and enslave the women and children. In the early part of the 13th century A. D. more humane treatment of prisoners of war became general, and the exchange of prisoners was established as a common custom. All civilized nations now treat prisoners of war in a humane manner. They provide for the wounded and look after the burial of the dead. Prisoners of war are kept in safe confinement until peace is concluded, unless either exchanged for prisoners taken by the opposite army or navy, or given liberty on parole. Many instances are on record in which modern prisoners of war were treated severely, though in most cases on account of unavoidable circumstances, or because the nations making the capture were to be classed among the savage or semicivilized.

PRISONS, the institutions which are constructed and maintained by states or nations as places of confinement for the safe keeping of persons in legal custody. The prison system may be said to be a result of modern civilization, since it has followed in its completeness the abolition of slavery and the feudal system

prevalent for many centuries in most countries of Europe. Instead of allowing the slave masters or feudal lords to institute systems of punishment, as was formerly the case, an offender against the peace and dignity of a state is now looked upon as a public charge and is held for trial in a jail or bridewell, and, after being tried and sentenced, he is sent to a workhouse, house of correction, reformatory, or penitentiary. The punishment is not designed to cause the prisoner to suffer physically or mentally, but all civilized nations are taxing themselves to provide prison systems that shall be more reformatory in character, not only separating the offender from the public as a benefit to the public, but also for the purpose of reforming the individual and leading him to become and remain a law-abiding and useful citizen.

In some countries death punishment is inflicted for the aggravated cases of criminal conduct, but many leading writers and students are beginning to look upon crime as a disease. According to this view the inclination toward crime is inherited very much the same as other traits of character or tendencies toward physical imperfections. Whether this or some other humane view of those inclined to crime is taken, it is certainly hopeful to notice that many reforms are being effected in the treatment of prisoners and the construction of houses of confinement. However, in some county jails and minor prisons much imperfection still exists. Many of these institutions are not only illy constructed, but their management is open to criticism. In many counties the jails are large buildings and are provided with wellplanned residence additions for the sheriff or bailiff. All the modern buildings of this kind are provided with separate cells for the confinement of youths and women, while in others the adult male prisoners are consigned to separate departments with the view of classifying them according to the nature of their character and reputation. The number of county jails in the United States is about 2,475 and the number of Federal and State prisons and penitentiaries is 78. The last census gives the number of prisoners in State prisons and penitentiaries at 47,500, in county jails at 20,500, and in city prisons at 4,250. Besides these are many workhouses and other correctional institutions that contain a considerable number of inmates.

Modern progress in reforming prison practice may be said to date from the early part of the 18th century, though in some countries dark dungeons were maintained long after that, in which prisoners were confined under the most objectionable circumstances. In some cases the prisoners perished after a short period of confinement. The Philadelphia Society for Assisting Distressed Prisoners dates from 1776, and may be said to be the first efficient organization in the world designed to reform prison practice.

Previously the benefits of separating prisoners were not recognized, but this and other similar societies inaugurated reforms in prison construction and discipline, and in the early part of the 19th century many of the states followed Pennsylvania in abolishing capital punishment, except for murder in the first degree. In 1829 the penitentiary at Philadelphia adopted the socalled Pennsylvania System, under which some classes of prisoners were permanently secluded from others. This system has been superseded almost universally by the Auburn System, by which convicts are separated by night and required to labor in silence with associates by day.

In 1825 the first institution for juveniles was established in New York, while Ohio was the first State to provide separate places of detention for juveniles, founding a reformatory for boys at Lancaster in 1858 and one for girls at Delaware in 1878. These institutions are now generally called industrial schools and are maintained in most of the states. Those confined there are taught the common school branches and various industrial pursuits, their labor being utilized quite largely to support the institutions. The chief occupations in which prisoners are employed include making brooms, furniture, utensils, buttons, boots and shoes, clothing and farming implements. In some counties pris-oners are employed in mining, carpentering, building railways and highways, and constructing various other public improvements. some states the prisoners are leased to those bidding highest for their labor, but this system is gradually going out of use. While the employment of prisoners is looked upon as a benefit to those in confinement, it should be the constant aim of the government to employ them at work that does not come into competition with free labor, since otherwise the system interferes with those having to support their families and the State. The marking system is employed in all prisons to a varied extent, under which the prisoners may by good conduct and industry shorten considerably the term of confinement. An examination into the condition of prisoners in the United States has disclosed that 75 per cent, have no trade, 24 per cent. are unable to read and write, and the average age is about thirty years.

PRITCHARD, Jeter Connelly, public man, born in Jonesboro, Tenn., June 12, 1857. After studying at public schools and Martins Creek Academy, he was apprenticed to a printer. At the age of fifteen years he removed to Bakersville, N. C., where he subsequently published the Roan Mountain Republican. In 1884 he was elected to the State Legislature, was reëlected in 1886 and 1890, and in 1895 was chosen for the unexpired term to the United States Senate. He was reëlected to the Senate in 1897 and on expiration of his term, in 1903, he was made associate justice of the Supreme Court of the District of Columbia. For a number of years he was the only Republican Senator from the South, and was a leader in the movement to develop a White Republican party in the Southern States, members of which became known as the Lily-Whites.

PRIVATEER (pri-va-ter'), a vessel owned and officered by private individuals, and licensed by letters of marque to carry on maritime war against the commerce and ships of an enemy. More than 400 privateers were fitted out by the British colonies to ravage the commerce of France in the colonial wars of America, and these inflicted great damage along the coast of the French possessions in Canada, in the West Indies, and on the coast of France. The Continental Congress authorized privateers in 1776, and before the end of that year they captured 342 British vessels. Since the owners and crews of privateers were given a large share of the prize property lawfully captured by their vessels, many sailors were attracted to the privateer service throughout the Revolution. In 1778 an American privateer captured the British fort of New Providence, in the Bahamas, and a sixteen-gun man-of-war. More than 500 British vessels were captured by American privateers in the War of 1812, and the service became so well organized that immense damage was done to the British on the coasts of the West Indies, the Canary Islands, and even Great Britain. In 1856 the great powers of Europe united in the Declaration of Paris, whereby it was mutually agreed that privateers should no longer be licensed, but the United States and several other nations have never accepted the treaty.

PRIVET (priv'et), an ornamental, bushy shrub native to Europe, but naturalized in some sections of North America. The several species include some that are evergreen or nearly evergreen. Several species are used for hedges. They have opposite, entire leaves and small white flowers with a pleasant odor, and yield a small, globular berry, mostly black, but some-times yellow or greenish in color. The wood is of value for making shoemakers' pegs and for turners' products, while the berries yield dyes

and are of service as bird food.

PRIVY COUNCIL (priv'y), the council of the sovereign of Great Britain. It is constituted of persons nominated by the crown at will, and of others on account of their rank or position. The Privy Council originated in the Norman period, but since the duties of government were assumed by the Cabinet its political importance has been greatly diminished. Among the members of the Privy Council are the Prime Minister, the members of the Cabinet, the archbishops, the Bishop of London, the Lord Chancellor and chief judges, the Commander in Chief, the great officers of State, the speaker of the House of Commons, and numerous dignitaries who are or were in responsible offices under the crown. The crown is limited in making nominations for the Privy Council to natural-born subjects, but no patent or grant is necessary. The Lord President of the Council is its legal head, and the debates and reports from the Council to the crown are under his direction. At present the Privy Council is rarely consulted, since its offices have been superseded largely by the Cabinet. Among the important functions exercised by it in recent times are the examination of George III. as to sanity, in 1788, and the determination whether Queen Caroline as queen consort had a right to the crown, in 1821. Right Honorable is the title of a Pr'vy Councilor. All the proceedings of the body are conducted in secrecy.

PRIVY SEAL, the minor seal appended by the sov reign of Great Brita. to certain documents, which are afterward authenticated by the great seal. It was used as early as the reign of Edward III., and for centuries was affixed by the authority of the Lord Chancellor. In 1884 an act was passed that all instruments to receive the great seal need only to be countersigned by the Lord Chancellor, Secretary of State, or a high official of the treasury. The privy seal is in the care of an officer called the lord privy seal, who now ranks as fifth great officer of the State, and is usually a member of the Cabinet.

PROA (pro'a), a sailing boat about thirty feet long and three feet wide, used extensively by the natives of the Ladron Islands and other islands of the Malay Archipelago. It is built with a stem and stern of similar structure, and may be sailed qually well in either direction. One side is flat, on a line from the stem to the stern, while the other side resembles an ordinary boat. The vessel is prevented from tipping by a frame extending to leeward, and in some boats the outrigger extends to both sides. Proas are of various sizes and their shape makes them capable of swift sailing under an ordinary pressure of wind upon the sail.

PROBATE COURT (pro'bat), a court that has jurisdiction of the proof of wills and the settlements of estates. The judge of a probate court is the officer who has charge of the instruments that purports to be the last will and testament of a person deceased. When a party files a will, after the decease of the testator, it is required in most cases that a notice of the same be published, and all interested may then appear at the time of hearing at which it is sought to admit the will to probate. A party offering a will is said to be the proponent and the party disputing its authenticity is known as the contestant. If the will, after the witnesses have testified, is not admitted to probate, the judge is said to pronounce the sentence of intestacy. In England the custody of the estates of deceased persons formerly vested in the ordinaries, or the bishops of dioceses, except the rights of the crown or of lords in respect to certain manors, but the act of 1857 abolished the ecclesiastical jurisdiction and conferred full and exclusive authority over all testamentary causes to the court of probate.

PROBUS (pro'bus), Marcus Aurelius, Emperor of Rome, born in Sirmium, in Pannonia, about 232; died in 282 A. D. The brilliancy of his military achievements caused Emperor Valerian to raise him to the rank of tribune long before the regular age. He commanded in the wars in Africa, Persia, and Germany. Zenobia had conquered Egypt, but he defeated her army and restored it as a Roman possession. Tacitus made him commander in chief of the provinces in the East. In 276, upon the death of the emperor, he was chosen by the army as Emperor of Rome and the senate immediately confirmed the selection. With a large army he invaded Gaul to expel the Germans, who were compelled to retreat across the Rhine. While in Germany he built fortifications at Ratisbon and Neustadt and finally concluded an alliance with the Goths. His administration was eminently successful. While draining the marshes of Sirmium a mutiny broke out among the soldiers and he was assassinated. Carus succeeded him as em.

PROCESS, in law, the whole proceedings in any action, civil or criminal, real or personal, from the beginning to the end. In a more technical sense, the term is applied to different stages of the procedure, such as the terms of the original process, which includes the precepts or writs by which one is called into court; the final process, or the forms of procedure by which judgment is carried into execution; and the mesne process, which covers the proceedings between the other two, embracing all proceedings properly so called, all writs for compelling the attendance of jurors or witnesses, and for other collateral purposes. Mesne and final process are sometimes collectively described by the term judicial process, because proceedings in these stages of an action are authorized in mediately by the courts, under the hands and seals of their presiding judges. However, in the strict technical sense, process is the means employed for bringing the defendant into court to answer to the action.

The first step in the procedure is to give the defendant notice of the issue and pendency of the original writ. This notice is given ordinarily by summons, informing the party to appear at the return of the writ, and is served upon him by the sheriff, constable, or some other similar officer. The party who brings such an action is known as the plaintiff, being the complainant, and the party against whom the action is brought is termed the defendant. The suit is commenced after both parties have entered an appearance or an appearance is entered for them, when they are said to be in court. Each party now makes a statement of the position taken upon the issues of the suit, such as statement comprising the pleadings, after which the issue is joined. Questions of law involved in

the cause are determined by the judge, while matters of fact are in most cases decided by the jury. A verdict is the decision or conclusion of the jury, while a judgment is the decision or sentence pronounced by the court.

Crime; Courts; Jury; Writ.

PROCTER (prok'ter), Adelaide Anne, poetess, born in London, England, Oct. 30, 1825; died there Feb 3, 1864. She was a daughter of Bryan W. Procter, secured an education in London, and at an early age devoted much time to poetic writings Her productions include many works which are still read extensively. They include "Legends and Lyrics" and many poems contributed to All the Year Round.

PROCTER, Bryan Waller, poet and prose writer, generally known as Barry Cornwall, born in London, England, Nov. 21, 1787; died Oct. 4, 1874. He studied at a boarding school and later became a classmate with Lord Byron and Sir Robert Peel at Harrow. In 1807 he entered upon a course of legal studies in London and contributed to the Literary Gazette. The death of his father, in 1816, brought him into possession of a small estate, and until 1820 he devoted his time largely to soliciting, but in the latter year he began writing under the pseudonym of Barry Cornwall. He was admitted to the bar in 1831 and became commissioner of lunacy the following year, which position he filled successfully until his resignation in 1861. Procter does not hold the highest rank among the writers of his time, but was particularly successful as author of many excellent songs and a number of tragedies. His writings of special note include "English Songs," "A Sicilian Story," "Flood of Thessaly," "Dramatic Scenes," "Memoir of Kean," "Marcian Colonna," and "Memoir of Charles Lamb.'

PROCTOR, Henry A., soldier, born in Wales in 1787; died in Liverpool, England, in 1859. He came to America at the beginning of the War of 1812, when he held the rank of a colonel. Sir Isaac Brock sent him with a force to Amherstburg to prevent Gen. William Hull from landing. On Aug. 5, 1812, he defeated the Americans at Brownstown, thereby contributing much to the fall of Detroit. In 1813 he defeated the Americans near Frenchtown, on the Raisin River, for which service he was promoted to the rank of brigadier general. General Harrison expelled him from Fort Meigs and defeated him in the Battle of the Thames on Oct. 5, 1813. The authorities tried him by courtmartial and he was suspended from service, but

was later reinstated.

PROCTOR, Richard Anthony, noted astronomer, born in Chelsea, England, March 23, 1837; died in New York City, Sept. 12, 1888. He graduated from Cambridge in 1860, became a fellow of the Royal Astronomical Society in 1866, and received a fellowship in the London King's College in 1873. In 1873 he made a lecturing tour of America. After observing the transits of Venus in 1874 and 1882, he published many valuable illustrated articles on stars. Proctor was not only a pleasing and popular lecturer, but an efficient and attractive writer. His writings cover numerous topics in relation to astronomy and extensive travels in America, Southern Europe, and Australia. His death resulted from yellow fever contracted while in Florida. A monument in the form of an observatory was erected to his memory near San Diego, Cal., in 1890. Among his best known works are "Other Worlds than Ours," "Great Pyramids," "Myths and Marvels of Astronomy," "Light Science for Leisure Hours," "Saturn and Its System," "Half Hours with the Telescope," "Old and New Astronomy," and "Orbs Around Us.

PROFIT (prof'it), the portion of the joint product of labor and capital which belongs to the employer. The employer may be and often is a capitalist, but he is not always necessarily the owner of the capital employed in commercial or industrial enterprises. Both capital and labor are within themselves helpless, since it is necessary to have an employer or business man to effect a union and put both in successful operation. If a large capital and many laborers are employed, it requires much ability to organize and manage a business. The profits of the employer usually depend upon the ability to manage, and, since they are generally proportioned to the volume transacted, large profits imply an increase and not a diminution of wages. Risk and uncertainty are attached to all business enterprises and the greater the elements of uncertainty the larger should be the profits. In general the profits are small upon single commodities, but they are usually quite large in cases where protection from close competition is provided through patents and copyrights, or where the output of an important product is controlled by large interests so as to create a monopoly.

Profits are classed as gross and net. Gross profit is that resulting from the difference between the original cost and the selling price, while net profit is what is left after deducting all charges. The proportion which the total profit bears to the capital employed is reckoned on a per cent. basis and is called the rate of profit. The gain or loss in business is termed profit and loss. These items are made a matter of record in bookkeeping, the former being placed on the credit and the latter on the debit

side of the ledger.

PROGRESSION (pro-gresh'ŭn), in mathematics, a succession of numbers, each derived from the preceding, according to a fixed law. The numbers which form a series are called terms. If the terms increase toward the right, they form an ascending series; if they decrease toward the left, the series is said to be descending. The first and last terms are the extremes. An arithmetical progression is a series whose terms increase or decrease by the addition or subtraction of a fixed number called the common difference, as 3, 5, 7, or 12, 10, 8, in which the common difference is 2. A geometrical progression is a series in which each term is formed by multiplying the previous one by a fixed number called the common ratio, as 3, 9, 27, 81, in which the common ratio is 3.

PROHIBITION PARTY (prō-hǐ-bǐsh'ŭn), a political organization of the United States, first established as a national organization in Chicago on Sept. 1, 1869. The prohibition movement in the United States dates from 1812, and the first law providing for the prohibition of the liquor traffic was enacted in Maine about Vermont and Rhode Island passed a 1851. similar law in 1852, Connecticut followed in 1854, and the states of New Hampshire, New York, Michigan, and Iowa enacted such laws in 1855. These laws were more or less modified or repealed, but the movement continued to gain many adherents. James Black of Pennsylvania was nominated for President in 1872. He received 5,608 votes and was the first presidential candidate of the Prohibition party. Green Clay Smith received 9,522 votes for President in 1876; Neal Dow, 10,305 votes in 1880; John P. Saint John, 150,369 votes in 1884; Clinton B. Fisk, 250,290 votes in 1888; and John Bidwell, 279,191 votes in 1892.

The party was divided on the money question in 1896, the two opposing factions being known as the Prohibition party and the National party. The former made prohibition the single issue and its candidate for President, Joshua Levering, received 130,560 votes, while the latter supported prohibition, bimetallism, and other issues under the leadership of Charles E. Bentley, who received 14,392 votes. In 1900 John G. Woolley was the candidate for President, receiving 207, 368 votes. Silas C. Swallow was the candidate in 1904, when the party polled 258,537 votes. Eugene W. Chafin was the Presidential nominee in 1908, receiving 250,481 votes. Chafin was again nominated in 1912 and received 208,923 of the popular votes. J. Frank Hanley of Indiana was the candidate for President in 1916 and rereceived 220,506 votes. The Prohibition party, though not large as a distinct organization, has had a wide influence for temperance and in making prohibition a national measure.

PROMETHEUS (prō-mē'thē-ŭs), in Greek legends, the son of Iapetus, brother of Atlas and of Epimetheus, and father of Deucalion. Hesiod, the oldest of Greek poets, relates that Prometheus was a Titan and that he formed man out of clay, into whom Athene breathed the spirit of life. He was pleased with the being thus formed and taught him astronomy, the alphabet, mathematics, and a number of the arts. Zeus denied mankind the gift of fire, but Prometheus brought sparks from the chariot of the sun and gave that necessary element to man. This so aroused the anger of Zeus that

he determined to be revenged, first on mankind, and then on Prometheus. He accordingly instructed Vulcan to mold a beautiful woman out of clay, determining that through her trouble and misery would be brought into the world, but, when Vulcan had completed his work, Zeus found her so beautiful that he endowed her with many special gifts. However, Prometheus was chained by Vulcan to a rock of the Caucasus, where a vulture fed upon his liver by day, though Zeus permitted it to grow anew every night. At length Hercules was moved to destroy the vulture and unlock the chains, and Prometheus was permitted to return to Olym-The story of Prometheus has entered largely into sculpture and literature, the most notable productions of the latter being "Prometheus Bound," by Aeschylus, and "Prome-

theus Unbound," by Shelley.
PROMISSORY NOTE (prom'is-so-ry), a promise in writing to pay a certain sum of money, either on demand or at a fixed future time. When the promise is to pay it to the payee or his order, the note is negotiable. It is signed by the maker, who is termed the payer. A note may be sold or transferred either with or without recourse on the payee. In the former case he merely signs his name on the back, when it is said to be endorsed, but to hold him liable in some states it is necessary to protest the note. Those who sell or transfer a note without assuming any responsibility write their name under the phrase, Without recourse. Below is the usual form of a negotiable promissory note:

\$680.00 Philadelphia, Pa., Oct. 10, 1909.

Three months after date, for value received, I promise to pay John Doe, or order, six hundred eighty and 00/100 dollars, with interest at the rate of six per cent. per annum.

Gottlieb Doe.

PRONGHORN (prong'hôrn), a small goat antelope native to the western part of North America, known as cabree by the French Canadians and as antelope in the United States. In some localities it is known as prongbuck. Formerly these animals were very numerous in the region lying west of the Missouri, extending from Mexico to the Saskatchewan River, but extensive settlements have reduced their range very materially. The adult is three feet high at the shoulders and about four and a half feet long, and the body is shaped like that of the deer. Small herds frequent the open plains and one of the number usually stands as monitor on an elevated point. The horns are spikelike, about one foot in length, and are replaced each spring by a new growth. A rudimentary form of horns are borne by the female, but they are not noticeable except at close contact. The flesh is of a fine flavor and highly nutri-

PRONOUN (pro'noun), in grammar, a word

used instead of a noun, as I, we, you, his, themselves. The properties are gender, person, number, and case, all of which are the same as that of its antecedent, except its case, which depends upon the construction of the clause in which it is found. Pronouns are either personal, possessive, relative, or interrogative. I, he, and you are personal; his, her, and their are possessive; what, which, and who are relative; and what, which and who, are interrogative pronouns. To these are sometimes added indefinite pronouns, as any, much, and some. Such words as that, this, and these are termed demonstrative pronouns.

PROOF READING, the art of reading proof sheets made in printing and indicating the necessary corrections by means of particular signs or marks. In printing it is necessary to take a rough impression from type, after the compositor has set an article, or part of an article, for the purpose of noting errors to be This is necessary in order to secorrected. cure correctness in spelling, punctuation, capitalization, paragraphs, pages, chapters, etc. It is not customary to read proof sheets of matters published in newspapers more than two times, but in bookwork from three to five readings are common. The first impression taken is called the first proof and is corrected by the compositor or manager of the printing office. This is used as a guide in making corrections in the type and a second or clean proof is made to be examined by the editor, who notes any alterations desired and instructs finally as to the printing.

In the case of composing for books a proof is taken after the page is made up, called a page proof, and later a foundry proof is taken to verify the work done in electrotyping. These proofs are read by one or more persons, and usually also by the editor or author, all exercising care that the matter is properly noted and marked for revision. Proof reading is a difficult art and requires remarkable care and ability to note all the matters demanding attention in an article or a part of it. It is not sufficient to examine every sentence, but every word and letter must be carefully observed, that nothing inaccurate may pass into print.

PROPHETS (prof'ets), those who speak as the inspired representatives of the Divine Being, who are mentioned in the Scriptures as teachers sent by God to utter predictions of future events. The first mention made of prophets occurs in Genesis, where Abraham is spoken of in that relation, and it is implied that Moses was one. However, the more typical prophets began with Samuel, who was likewise a civil ruler, but the prophetic order did not fully develop until the separation of the Israelites into two kingdoms. It is thought that the order of prophets partook of the nature of a school and that young men of the different tribes were admitted into membership, who received instruction in sacred poetry, music, and law. Judah, being generally faithful to Jehovah, did not develop many prophets, but in Israel the prophets were prominent and influential, and devoted much time and energy to opposing apostasy and moral depravity. Elijah and Elisha were among the early prophets who left no written works, but the later prophets committed their messages to writing.

Sixteen prophets of the later period of the Old Testament left books that became recognized as a part of the Old Testament canon. They are divided into the four greater and the twelve lesser prophets. The four greater prophets are Isaiah, Jeremiah, Ezekiel, and Daniel, whose books precede the others in the order named. The twelve lesser prophets are Hosea, Joel, Amos, Obadiah, Jonah, Micah, Nahum, Habakkuk, Zephaniah, Haggai, Zechariah, and Malachi. Hosea, Amos, and Jonah belong to the kingdom of Israel as distinct from the kingdom of Judah; Joel, Isaiah, Jeremiah, Obadiah, Micah, Nahum, Habakkuk, and Zephaniah belong to the kingdom of Judah; Ezekiel and Daniel, to the period of captivity; and Haggai, Zechariah, and Malachi, to the period after the return from captivity. Some of the prophets are mentioned as being particularly skilled in using the psaltery, harp, cymbal, and pipe. The higher classes of prophets had inferior prophets to attend upon them and look after their means of subsistence. Many of them were married and had families, including Moses, Hosea, and Isaiah. The wife of Isaiah is spoken of as a prophetess.

PROPORTION (pro-por'shun), in mathematics, the relation of one quantity to another. This relation may be expressed by the difference of the quantities or by their quotient. In the former case it is called arithmetical relation, in the latter, geometrical proportion. The measure of geometrical proportion is called the ratio; that is to say, ratio is the number of times one quantity contains another taken as a standard. Proportion is sometimes called the rule of three, since the fourth term may be found when the other three terms are given. In the arithmetical proportion, 3:6::12:24, it will be seen that the ratio of 3 to 6 is the same as that of 12 to 24, and, knowing any three of the given term, it is apparent that the fourth can be found. In the algebraic expression, a:b::c:d, is indicated that the ratio of a to b is the same as the ratio of c to d. All the figures or letters of a complete expression are called the terms of the proportion, while the first and last terms are its extremes and the intermediate terms are the means. In the above expression a, b, c, and d are the terms; a and d, the extremes; b and c, the means; a and c, the antecedents; b and d, the consequents.

PROSE, the ordinary language used in speaking or writing, distinguished from poetry, which is cast in poetical measure or rhythm.

Classical prose, though known less extensively than classical poetry, may be considered the most important department of literature. Although a large majority of the dull and commonplace discourses are in prose, it must be admitted that a large proportion of the artistic and finished writings are likewise in the prosaical form. See

PROSERPINA (pros'er-pi-na), a Greek goddess, daughter of Zeus and Demeter, who was usually called Persephone by the Greeks. It is related that she was gathering flowers in a meadow of Sicily, when a yawning abyss opened at her feet, and she was carried by Pluto to the gloomy realms over which he reigned. When Demeter became conscious of her loss, she was stricken with intense grief and wandered nine days and nights without tidings from her child. On the tenth day she learned by consulting Helios that Pluto had carried her daughter to the under world, and, after imploring him with great fervor, it was agreed that Proserpina should spend one-half of every year with her mother and the heavenly gods and pass the rest of the year with Pluto beneath the earth. Writers have spoken of this legend as indicating the planting of seeds in the earth, which, after about nine days, send the tender plants forth, while the matured seeds remain about one-half year in the granary.

PROTAGORAS (pro-tag'o-ras), Greek philosopher, born in Abdera, in Thrace, about 481 B. C.; died about 411. He was a contemporary of Socrates and was the first to assume the title of Sophist. He admonished to educational effort and taught that the measure of all things is to be found in man. All his works are lost. Some were burned at Athens before his death, and he was banished on a charge of being an atheist. It is thought his death occurred at sea while proceeding to Sicily. His chief work is a treatise entitled "On the Gods."

PROTECTION (prô-těk'shun), an economic theory by which governments seek to limit imports for the benefit of home manufacturers. The principle of protection was recognized distinctly by the first tariff levied in the United States, in 1789, though the amount of protection was moderate. It has been the policy of the government to combine a protective tariff tax with the plan of internal improvements at national expense, and such a policy has been sustained during all its history, except in the period from the establishment of the Walker tariff in 1846 to that of the Morrill tariff in 1861.

Writers on political economy are much divided as to the practical effect of a protective tariff. It is claimed on the one hand that it is absolutely necessary to protect home industry to enable the producers of a protected article to receive in return for their services a fair renuneration. Those taking the opposite view assert that the uniform effect of the policy is to render the article produced both dear and bad.

Tariff duties are usually of two classes-protective and prohibitory. A protective tariff aims to provide conditions under which articles of foreign and home manufacture can compete in the market on terms nearly equal, while a prohibitory tariff has the effect of excluding foreign products from the market.

The protective system was first proposed on a large scale by an Italian in the suite of Catherine de' Medici and soon after legislation developed whereby retaliatory tariffs were levied in a number of countries, as the tariff of England in 1692, which taxed the goods imported from France on an average about 75 per cent. In the period between 1818 and 1824 all bounties to manufacturers were abolished in Britain, and this, with the repeal of the corn and navigation laws, ended the protective policy in that country. In the United States a large proportion of the people still favor a protective policy, although a considerable minority is in favor of free trade. See Tariff; Free Trade, etc.

PROTECTOR (prô-těkť er), the official title of one appointed in England as a regent of the kingdom during the minority or incapacity of the sovereign. The Earl of Pembroke was among the first protectors, serving in 1216 during the minority of Henry III. Oliver Cromwell assumed the title of Lord Protector in 1653 over England, Ireland, and Scotland, serving until 1658, and was succeeded in that capacity

by Richard Cromwell.

PROTEIDS (pro'te-idz), the name of sev. eral important animal and vegetable compounds, some of which are found in solutions or viscous solids in nearly all animal and vegetable organisms. They are formed exclusively in plants and undergo but slight alteration when consumed as food and stored up by animals. However, man derives the proteids, or nitrogenous, foodstuffs principally from grains, vegetables, eggs and milk, and the flesh of animals, birds, and fishes. The constituents of proteids are similar to those of protein, containing carbon, hydrogen, nitrogen, oxygen, and sulphur.

PROTEIN (pro'te-in), the name of certain chemical substances which occur in the organism of plants and animals. They are composed principally of oxygen, carbon, nitrogen, and hydrogen. These substances are important as food, serving to furnish heat and to repair and build up the body. The proteins are classified, not according to their chemical composition, but according to their physical properties and their action upon certain reagents. They include the foods known as proteids and nonproteids, of which the former, or albuminoids, are the most important. The albuminoids, known as true proteids, are exemplified in the gluten of wheat, the albumin of eggs, and the casein of milk.

PROTESILAUS (pro-tes-i-la'us), King of Phylace, in Thessaly, son of Jason. It is related in the Iliad that he was the first who leaped from the ships upon the shore of Troy, and Lucian says that he was killed by Hector, being the first Greek to fall in the Trojan War. The affection between Protesilaus and his wife Laodamia is celebrated by the poets. After his death she prayed to be permitted to converse with him for the space of three hours. This prayer was granted and he was conducted from the lower world by Mercury, but when he returned his wife killed herself and accompanied her husband.

PROTESTANTS (prot'es-tants), the designation applied to Christians who deny the authority of the Pope and hold to the right of private judgment in the matter of religion. The name was first applied to the princes and other adherents of Luther, who, at the second council of Spires, held on April 19, 1529, protested against the decree of the majority, representing the Roman Catholic states of Europe. This decree involved a virtual submission of the reformers, who not only dissented from the decree, but appealed to a general council. Among the leading princes who followed the leadership of Luther were Landgrave Philip of Hesse, the Electors George of Brandenburg and John of Saxony, Prince Wolfgang of Anhalt, and Princes Ernest and Francis of Brunswick-Luneburg. Many imperial cities joined the movement under Luther. They were Ulm, Strassburg, Nuremberg, Constance, and ten others.

The Protestant churches include the denominations which are not Roman and Greek Catholic, embracing the Lutheran, Presbyterian, Methodist, and other ecclesiastical bodies, though several branches of the Anglican Church do not accept the classification as historically correct when applied to them. Among the fundamental doctrines of Protestantism are the supremacy of the Bible above bishops and councils, individual responsibility, justification by faith, and freedom within the authority of the Bible of conscience and worship. The branches of the Protestant Church are more or less widely distributed, though the Teutonic peoples of Northern Europe and their descendants have had and still make up the largest membership. It has been difficult for Protestantism to make material advances among the Latin peoples of Southern Europe and their descendants. Protestant churches of the world have a membership of 163,300,000.

PROTEUS (pro'te-us), the Greek sea myth known as "The Old Man of the Sea," regarded a son of Neptune. He is represented as a marine deity, who tended the flocks of seal at the bottom of the sea, but at the hour of noon came up to the island of Pharos, on the Egyptian coast. It was his custom to slumber beneath the grateful shade of the rocks while surrounded by flocks of seals, and his coming was awaited with interest, since he possessed the gift of prophecy. Those consulting him were obliged to hold him in their embrace, as he endeavored to escape, and for that purpose

changed himself into various hideous forms and objects. When at last wearied from effort to escape, he foretold future events and again dived to the bottom of the sea, accompanied by the animals he tended.

PROTOPLASM (pro'to-plaz'm), the elementary living matter of plant and animal structures. Its chemical constituents are about eighty per cent, of water and about twenty per cent. of solids, chiefly proteids. The proteids found in protoplasm consist mainly of peptones, albumoses, and globulins, with small quantities of salt, fat, and carbohydrates. All organized bodies contain protoplasm. It is seen in its simplest form in the lowest animals, as in the protozoa. Protoplasm is transparent and can absorb, excrete, secrete, grow, move, and multiply. It is not elaborated from minerals by animals, but they derive it from plants or other animals by converting the dead into living protoplasm. However, plants derive it from the air and mineral substances, thus providing a supply of this essential substance for the use of animals. Huxley spoke of protoplasm as the physical basis of life, since it seems to be the original life principle, and is found in all organized bodies.

PROTOZOA (prō-tō-zō'à), one of the subdivisions of the animal kingdom. It is a division of the invertebrate animals, embracing those that have a simple structureless organism, reducible to a cell or cell contents, without any distinct separation of system or organs. Cuvier and Agassiz include the vertebrates, articulates, mollusks, and radiates among the distinct divisions of the animal kingdom, while others add a fifth branch, the protozoa. However, the last mentioned, as formulated by some writers, includes forms of life that are now known to be plants and others are embryonic forms of crustaceans, mollusks, and worms. As generally defined, the protozoa includes the foraminifera, rhizopods, and some of the infusoria. All the animals belonging to this division are minute and but few can be seen without the microscope. While a few live in moist earth or as parasites on or in other living organisms, the larger number are found in fresh and salt waters. The food is taken into the protoplasm, the name applied to their nearly structureless substance, either by a specialized mouth, or by any part of the cell substance, in the form of particles. As a rule they are incapable of assimilating nitrogen, since their cells consist largely of nitrates or carbonates. Reproduction is usually by spore formation, fission, or gemmation. Sponges belong to the protozoa and constitute the largest form. An infusore is said to be the cause of hay fever and other diseases, but many species are important in that they act as scavengers. Extensive beds of rocks have been built up by the skeletons of these animals.

PROTOZOIC ERA. See Geology. PROUDHON (proo-don'). Pierre Joseph, political and economical writer, born at Besancon, France, July 15, 1809; died in Paris, France, Jan. 19, 1865. He was the son of a cooper and received the rudiments of an education at the college in his native town, and in 1828 entered a printing office as proof reader. While in this position he acquired considerable ability as a linguist, and published a work on French grammar of such merit that he was awarded a pension by the Academy of Besançon. In 1840 he published a work on political economy, in which he advanced many radical theories and treated property as the result of theft. This and other similar works caused him to be prosecuted, but he was ultimately acquitted. From 1843 to 1847 he superintended a water transport system at Lyons on the Saone and Rhone rivers. He settled in Paris in the latter year, and became a leader of the Revolution of 1848 by publishing an aggressive journal devoted to extreme democracy and socialism. His paper was suppressed by the government, but he was chosen by a large vote as a representative from the department of the Seine in the constituent assembly. The extremely radical views expressed by nim caused a majority of the members to seek to suppress his addresses in rendering them inaudible and ineffective by making disturbances. However, he reached the masses. by publishing three daily papers in Paris, and in 1849 was imprisoned on a three years' sentence on the charge of inciting insurrections. In 1852 he attained his liberty and settled in Belgium, where he continued publishing ad-dresses and works on political and economical reforms. Though radical, Proudhon was influential as a writer and speaker, and his fines and much of his expense were defrayed by popular subscription.

PROVENÇAL (pro-van-sal'), the name used to designate the different Romanic dialects formerly spoken and written in the south of France, which are employed at present by country people in the region included in the former province of Provence. Collectively they are classed as one of the six chief Romance or neo-Latin languages and sometimes as a dialect of French. Provençal is inflected more than the other dialects of its class and was the first to be fixed grammatically. The earhest writings in the Provençal language date from the 9th century, and in the 11th and 12th centuries its literature spread over a large portion of southern France and into northern Italy and Spain. Its widest use and highest development were reached in the later part of the 12th century. The highly inflectional properties make it particularly adaptable to the production of poetic forms, though in modern times it is more simply inflected than in the ancient, and a considerable number of French words and terms have been incorporated with it. Provencal literature was revived notably in the 19th century.

PROVERBS (prov'erbz), the wisdom of experience condensed into brief and pithy sayings. Many definitions have been applied by numerous writers and much energy has been devoted to forming and collecting proverbs from the different races and ages. Aristotle spoke of proverbs as remnants that were saved from the ruins of ancient philosophy on account of their shortness. Agricola considered them short sentences into which the ancients compressed life, Erasmus regarded them as well-known forms framed from somewhat uncommon sayings, and Bacon defined them as the genius, wit, and spirit of a nation. Sayings that contain wit and truth, but are applicable only in one line of conversation or to illustrate a specific idea, are not properly proverbs, since a proverb must be a saying that has long been in general use and has been accepted by the people. As a rule a proverb originates of its own accord by the sense and method contained in it, and usually reflects the people with whom it originated. Thus a proverb does not originate from any one individual, but springs into use by popular approval, and ultimately passes from nation to nation until it becomes the heritage of the race. Many of the proverbs in general use are of very early origin, some of them coming from Arabia and Persia, though as a rule it is quite difficult to determine whence the best and most popular proverbs now in use first sprang into existence.

The first collection of Arabic proverbs dates from the 11th century, and different nations have made similar collections and adopted many of those drawn from other sources. It may be said that the Spanish people have the largest number of proverbs, estimated at about 25,000. The literature of Iceland is rich in proverbs and so is that of the German and Scandinavian languages. The Arabs have the largest number of proverbs of Asiatic nations, but those of Persia, Hindustan, and Turkey are likewise numerous. Such proverbs as "Time is money," "God tempers the wind to the shorn lamb," "Hit the nail on the head," "Strike while the iron is hot," "Put the matter in a nutshell," and many others are practically in universal use. The Book of Proverbs is a part of the Bible and contains a collection of popular sayings, but the book is not constituted exclusively of proverbs. It is generally attributed to Solomon, though many of the sayings do not appear to be founded solely on his own experience, but rest at least partly on the shrewd observation of the nation at large. It includes many sayings that were coined in earlier times. Many of the proverbs drawn from this book are in popular use, and the New Testament in many instances quotes directly from it.

PROVIDENCE (prov'i-dens), the capital of Rhode Island, county seat of Providence County, 42 miles southwest of Boston, Mass. It is located on the Providence River, an arm of Narragansett Bay, and has communication by the New York, New Haven and Hartford and other railways. The site includes about 20 square miles, being located on both sides of the Providence River, and the eastern limits extend to the Seekonk River. An undulating and somewhat hilly surface is in the eastern part, while the west side is a somewhat sandy plain. Beautiful sites for residences are plentiful in the higher section, where the elevations reach about 200 feet. Along the river and bay is a considerable tract that has been made by grading, and here are some of the largest and most substantial business houses.

All parts of the city are regularly platted, but some of the thoroughfares in the older part are narrow and crooked. Nearly 250 miles of streets are covered with pavements, constructed largely of stone and macadam. Boulevards extend through the residential portion and to Roger Williams Park, which consists of 540 acres. It has a fine statue of Roger Williams, zoölogical gardens, and artificial lakes. Near the city hall is a statue of General Burnside and in front of this building is the Soldiers' and Sailors' Monument. The State capitol, a massive structure of marble and granite, was completed in 1900. Other prominent buildings include the city hall, the post office and Federal building, the county courthouse, and the union railway depot. Providence has many large business and office buildings, such as the Barton Block, the National Exchange Bank, the Athenaeum, and the Equitable, Bannington, and Industrial Trust buildings.

The city has a well-organized system of public schools, ranging from the kindergarten to the high school. It is the seat of a State normal school, the Rhode Island School, and the Rhode Island School of Design. In its public library are 92,500 volumes. Brown University, located on the east side, has a large and well-selected Other extensive collections include those of the State, the Young Men's Christian Association, and the Providence Athenaeum. Many charitable institutions are maintained, including the Rhode Island hospital, the State institute for the deaf, and Dexter Asylum for the poor. The Friends' School, founded in 1818, is celebrated as a center of learning. All the leading Christian denominations have fine churches. They include the Central Baptist, the Saint Stephen's Episcopal, the First Universalist, the Roman Catholic Cathedral of Saint Peter and Saint Paul, the Trinity Methodist, the Grace Episcopal, and the Union Congregational.

Providence ranks as the second commercial city of New England, being exceeded only by Boston. It is a port of entry and has an extensive harbor. Although the larger part of the trade is domestic and coastwise, it handles a large volume of foreign commerce. As a wholesale and jobbing center it takes high rank and carries a large business in coal, grain, live stock,

and manufactures. In the output of jewelry it holds a high place among the cities of the United States. Silverware, files, screws, cotton and woolen goods, engines and boilers, and machinery are produced extensively. It is a slaughtering and meat-packing center and has large interests in dyeing and finishing textiles. Other products include malt liquors, rubber and elastic goods, boots and shoes, firearms, and tobacco products.

Communication within the city is by an extensive system of electric railways, from which branch lines extend to suburban and interurban points. Municipal lighting is by gas and electricity. It has an extensive system of waterworks and well-organized police and fire departments. The city is located on a tract of land which was settled by Roger Williams in 1636. He established the first Baptist church organized in America, separated the temporal from the spiritual affairs, and extended religious toleration to all. During the Revolutionary War the city suffered considerably, but it became more prosperous after the War of 1812. In 1832 it was chartered as a city. At present it ranks among the wealthiest and most prosperous cities in the United States. Population, 1910, 224,326.

PROVO CITY (pro'vô), a city in Utah, county seat of Utah County, on the Provo River, about 45 miles south of Salt Lake City. It is on the Rio Grande Western and the Oregon Short Line railroads. The noteworthy buildings include the Brigham Young Academy, the State Insane Asylum, the Proctor Academy, the public library, and the high school. Utah Lake, Provo Cañon, and Bridal Veil Falls are attractions in the vicinity. It is surrounded by a fertile farming region and has a large trade in cereals, live stock, and merchandise. The manufactures include flour, leather, machinery, and woolen goods. Electric lights and waterworks are among the municipal facilities, and, being easily accessible by railways, it is a favorite resort for summer tourists. Provo City was settled in 1849 and incorporated in 1851. Population, 1900, 6,185; in 1910, 8,925.

PROWSE, Daniel Woodley, jurist and author, born at Saint John's, Newfoundland, in 1834. He studied at Saint John's and at Liverpool, England, and was admitted to the bar in 1858. For some time he was a member of the Legislature and in 1869 became judge of the central district court. He contributed to many periodicals and works of general reference, including the *Encyclopaedia Britannica*. His books include "History of Newfoundland" and "Manual for Magistrates in Newfoundland."

PRUNES, the dried fruit of any one of several species of the common plum. Prunes are produced extensively in California, Oregon and southern Europe, and are known in the market from the country producing them, as California, Spanish, German, Turkish, and French prunes. They are used extensively as

PRUNING

a food, after being prepared by stewing, and in some countries brandy is distilled from them.

PRUNING, the act of cutting off superfluous branches, shoots, or roots of trees and shrubs for the purpose of bringing the plants to a particular form, or with the view of strengthening the growth of the parts remain-Many plants throw out unprofitable growths, thus decreasing the production of flowers and fruit, while some assume a form either -undesirable or illy calculated to withstand the effect of wind and weather. The ultimate result of judicious pruning is an increase in the vitallty of the plant and in the size and quality of This result is due to the removal of Its fruit excessive branches, thus exposing the inner limbs to a greater amount of sunlight and causing a larger quantity of vital sap to flow to the flowers and fruit. In some countries forest trees are pruned with the view of influencing the growth of their trunks as to size and direction, while in flower culture plants are trimmed to increase the size and vigor of their ornamental parts. Root pruning is generally effected to increase the beauty and size of flowers. Both classes of pruning depend upon the plants to be improved, since the removal of a large number of roots and branches may impair general growth. Pruning out of season is particularly harmful.

PRUSSIA (prush'a), in German Preussen, a kingdom of Europe and the most important state of the German Empire. It is situated in the northern part of Germany and is divided into the following thirteen provinces: East Prussia, West Prussia, Brandenburg, Pomerania, Posen, Silesia, Saxony, Schleswig-Hol-Hesse-Nassau, Hanover, Westphalia, Rhenish Prussia, and Hohenzollern. Silesia is the largest province, area 15,568 square miles, and Hohenzollers, is the smallest, area 441 square miles. The total area is 134,548 square miles. Berlin is the capital and largest city. Other cities of importance include Breslau, Cologne, Danzig, Düsseldorf, Frankfort, Hanover, Königsberg, Magdeburg, Altona, Elberfeld, Barmen, Stettin, Krefeld, Aachen, and Halle.

DESCRIPTION. The western part of Prussia is more or less hilly and mountainous, but the general surface of the vast territory lying toward the north and east is included in the plain stretching from the Ural Mountains to Holland and its surface is quite level or undulating. The general drainage is toward the north into the Baltic Sea and the North Sea. Among the principal rivers are the Weser, Elbe, Oder, and Vistula, all having their source near the southern boundary, while the Nieman flows through the northeastern part and the Rhine though the western part. Other streams include the Eider, Ems, and Pregel. The principal rivers have been improved for navigation by a network of canals and all parts of the kingdom have an adequate railway service. Formerly the region was covered by a vast expanse of forests, and about 21 per cent. of the surface is still covered with timber. Indeed, forestry is an important industry, the production of timber being a source of great wealth. Much of the soil is exceedingly fertile, though in some portions marshes and peat moors are extensive, while in others the soil is of a light, sandy formation, as is the case in both East Prussia and West Prussia. The Rhine valley is noted as the most picturesque and fertile part of Germany. It is famous on account of its fine orchards and vineyards.

INDUSTRIES. Farming is one of the leading enterprises and the soil is tilled with much care. Among the leading products are wheat, barley, oats, maize, potatoes, sugar beets, and garden produce. It has a large yield of tobacco, flax, hemp, and domestic animals, particularly horses, cattle, sheep, swine, and poultry. Mining is an important industry, the products including coal, peat, iron, zinc, lead, copper, cobalt, silver, salts, copperas, manganese, and nickel. Among the manufactures are beet-root sugar, tobacco products, cotton and woolen goods, chicory, scientific instruments, machinery, ships and sailing vessels, engines and boilers, and utensils. The railroad and canal trade is of growing importance and its seaports have been noted as centers of commerce for centuries. It has a vast trade in textile fabrics, chemicals, metal wares, leather, glass, coal, stoneware, timber, and live stock. The leading port cities include Stettin, Flensburg, Königsberg, Memel, Stralsund, Kiel, and Pillau on the Baltic, and the

North Sea port of Altona.

EDUCATIONAL. Prussia is particularly famous on account of its splendid educational institutions. Attendance at all the public elementary schools is compulsory. Education is supported by local and state aid. The period at which children are required to attend ranges from six to fourteen years, and the population within this limit aggregates 6,750,000. Among the noted institutions that have made Prussia famous are the ten universities of Berlin, Halle, Göttingen, Königsberg, Greifswald, Münster, Breslau, Kiel, Bonn, and Marburg. These institutions have about 1,450 professors and teachers and an attendance of 18,500 students. They are uniformly equipped with modern apparatus, museums, and libraries. The Royal Library at Berlin is one of the most famous in the world. Many literary, scientific, and artistic schools and societies are maintained, such as the Academy of Arts, founded in 1699, the Antiquarian Society of Stettin, the Royal Museum of Arts of Berlin, and the Breslau Historical Society.

INHABITANTS. Practically the entire population belongs to the German race, the principal exception being about 400,000 Jews and 2,150,-000 Poles. The original inhabitants, known as the old Prussians, have been absorbed by the Teutonic element. The Poles are confined largely to Posen and Silesia. Population, 1905, 37,-293,324; in 1910, 40,163,333.

GOVERNMENT. The government is a constitutional monarchy and the crown is hereditary in the male line. The king is assisted by a council of ministers appointed by royal decree. It has a legislative assembly called the Landtag, composed of two chambers, the Herrenhaus and the Abgeordnetenhaus. The upper chamber has a membership of about 300, including princes, titled noblemen, and life peers; while the second chamber includes 443 members chosen by popular suffrage, the membership being based on a ratio of the population in the different provinces of the kingdom. Prussia is the most potent factor in the German Empire. The King of Prussia is the Emperor of Germany and his chief ministers of state are the same as those chosen for the empire. The army and navy are an integral part of those of Germany, while the representation in the national Bundesrath is numerically the largest. It has 17 members in that body, and 236 deputies in the diet or

HISTORY. It is thought that when the Phoenicians visited the North and Baltic seas, in the 4th century B. c., they found Slavonic tribes occupying the region at present comprised in northern Prussia, but little is known of these people until in the 10th century, when they are mentioned by a number of writers as Borussi or Porussi. Their fear of losing independence caused them to battle against the advance of Christianity with marked determination, and in 997 Bishop Adalbert of Prague was martyred by them. The Knights of the Teutonic Order of Saint George entered upon a crusade against them in the middle of the 13th century and formally established the Christian faith. A considerable part of Prussia was governed by the Teutonic Knights under a despotic form until 1466, when their power was overthrown by the allied torces of the Prussians and Poles. At that time West Prussia became a part of Poland and East Prussia was made a Polish fief, but in 1618 the duchy of Prussia was established and John Sigismund, Elector of Brandenburg, became Duke of Prussia, and since that time the government has been vested in the Hohenzollern-Brandenburg dynasty.

Prussia was a noted seat of action in the revival of learning and the center of activity in the Reformation. It was connected more or less prominently with the early German Empire that included Austria and Italy, and took a large part in the contests that led to the overthrow of Napoleon in 1815. The larger importance of Prussia in modern times dates from 1866, when it undertook an aggressive movement against the power of Austria, which not only consolidated many of the German states with Prussia, but resulted in the organization of the German Empire after the Franco-German War of 1870-71, the Prussian kirg assum-

ing the title of Emperor of Germany. See Germany.

PRUSSIC ACID (prus'sik), a colorless liquid discovered by Scheele in 1783, known scientifically as hydrocyanic acid or cyanide of hydrogen. It has a specific gravity of .7, boils at 80°, and solidifies at 5°, forming feathery crystals. Prussic acid is obtained from many sources, including the kernel of the bitter almond and the fruits of the peach and apricot families. It is derived from the leaves of the cherry, laurel, and peach and from different parts of various plants. A weak solution of prussic acid is useful in treating bronchitis and affections of the mucous membrane, but, when administered in excessive doses, it acts as a dangerous poison and death results quickly.

PRUTH (prooth), a tributary of the Danube River, rising near the boundary of Galicia and Hungary, on the northeastern side of the Carpathian Mountains. After a course of about 500 miles toward the southeast it joins the Danube at Galatz. It forms the boundary between Rumania and Russia, has a deep valley, and is navigable to Jassy.

PSALMS (samz), Book of, a book of the Old Testament, containing the songs of praise used by the Jews in their worship in the temple. It contains 150 psalms, or sacred lyrics, and was arranged by the Hebrews in five books, each having a particular superscription and terminating with a doxology. It is evident that the book was brought together from many sources and that its composition and compilation extended over many centuries. Some writers have assigned it almost entirely to David, but others think that Solomon wrote a number of the psalms. It is certain that some of them were not written until after the Babylonian captivity, and still others in the time of the Maccabees. About seventy allusions were made to the Psalms by Jesus and his apostles.

PRZEMYSL (pzhēm'īsl), a city of Austria-Hungary, in Galicia, on the San River, 50 miles southwest of Lemberg. It is a railway and trade center. The Russians captured it in March, 1915, but lost it soon after. Population, 1914, 57,862.

PSEUDONYMS (sū'dō-nimz), the fictitious names assumed by writers to conceal their identity. They are frequently called nom de plumes. The practice of publishing books and magazine articles under a false name originated with persons who wanted to induce people to believe them one works of those whose names they bore, and because the writers did not care to be spoken of in connection with their publications. Many young authors have become connected with pseudonymous names for the reason that they did not wish to risk revealing their identity, and later the assumed names clung to them and became more widely known than their real names. This is particularly true of such writers as Marian Evans and D. R.

Locke, who are better known by their respective pseudonyms, George Eliot and Petroleum V. Nasby. The following is an abbreviated list of pseudonyms adopted by famous authors:

Adeler, Max	Charles Heber Clark.
Atlas	Edmund Vates
Bab	
Bell, Acton	Anne Brontë
Bell, Currer	
Bell, Ellis	Emily Jane Bronts
Bickerstaff, Isaac	
Riglow Hoses	Inmes Russell Towell
Biglow, Hosea	Henry W Shaw
Blouet, Paul	Mar O'Pail
Boz	
Breitmann, Hans	Chas G. Laland
Bystander	Coldwin Smith
Carmen Sylva	Ougan of Pumania
Caxton, Pisistratus	Lord I witten (Pinet)
Crayon, Geoffrey	Washington Tribe.
Creyton, Paul	T T Translation
Elia	Charles Lamb.
Ellot, George	Marian Cross Evans.
Fern, Fanny	Sara P. Parton.
Graduate of Oxford	John Ruskin.
Greenwood, Grace	Mrs. S. J. Lippincott.
Н. Н	Helen Hunt Jackson.
Hamilton, Gail	Mary Abigail Dodge.
Harland, Marion	Mrs. M. V. Terhune.
Ian Maclaren	John Watson.
Ik Marvel	D. G. Mitchell.
Jean Paul	J. P. F. Richter.
Johnson, Benj. F. Kerr, Orpheus C.	James Whitcomb Riley.
Kerr, Orpheus C	R. H. Newell.
Knickerbocker, Diedrich	
Lyall, Edna	Ada Ellen Bayly.
Meredith, Owen	Earl of Lytton.
Miller, Joaquin	C. H. Miller.
Nasby, Petroleum V	D. R. Locke.
North, Christopher	John Wilson.
Nye, Bill	Edgar Wilson Nye.
Opium Eater	T. de Quincey.
Optic, Oliver	W. T. Adams.
Ouida	Louise de la Ramée.
Paolo, Frà	Paolo Sarpi.
Pindar, Peter Quad, M	John Wolcott.
Ouad. M	C. B. Lewis.
Rob Rov	John Macgregor.
Sand, George	Madame Dudevant.
Shirley	John Skelton.
Slick Sam	T. C. Haliburton.
Titcomb. Timothy	I. G. Holland.
Titcomb, Timothy	W. M. Thackeray.
Twain Mark	Samuel L. Clemens.
Uncle Remus	loel Chandler Harris.
Ward, Artemus	Charles F. Browne.
Wetherell, Elizabeth	Sugar Warner

PSYCHE (sī'kē), in Greek mythology, the youngest of three princesses, whose beauty excited the jealousy of Venus and so attracted those with whom she came in contact that she was often mistaken for Venus. After observing for some time the popularity of Psyche, Venus sent Cupid, or Love, to inspire her with admiration for the most contemptible objects. However, Cupid himself soon became enamored of her and his passions were fully reciprocated by the maiden. The nightly visits of the two lovers attracted the attention of the two jealous sisters of Psyche, who prevailed upon her to fear that she was in courtship with a monster. Although it had been previously understood that the maiden should not inquire regarding the personal affairs of Cupid, she was so aroused to curiosity that on one occasion she carried a burning lamp to the chamber of her lover, in whom she discovered the handsomest of gods. In the excitement that followed Cupid was awakened from his sleep, only to reprove her for her doubts and vanished from her sight. Soon after Psyche and Venus became fully reconciled, and the two lovers were united in immortal wedlock with the sanction of Jupiter. Writers generally regard the story of Psyche as personifying the human soul in its progress through the afflictions of life until immortal

peace is realized.

PSYCHOLOGY (st-kŏl'ō-jy), the science of the human soul, treating the phenomena of its attributes and operations as manifested in connection with the body. The study of this branch of knowledge has been variously designated as mental science, mental philosophy, and metaphysics, though the last stated term in its scope often designates more than psychology, and at other times less. As a science it is to be classed with the inductive group, since its laws are discovered by observation, either through the agency of personal study or by the testimony of others. Although a knowledge of psychology is of much value to all, especially to teachers and professional men, its study is either limited or neglected, largely because it demands close observation, careful reflection, and precision in making discrimination. Besides, there are many differences of opinion regarding divers matters of interest in relation to the nature and operation of the different faculties of the mind. However, the multiplication of text-books and greater interest in professional associations are fast extending study and broadening research.

MENTAL Powers. Though man is known to be constituted of mind and matter, the nature of neither is definitely understood, and we may study them only by their acts or effects upon each other and upon external things. Both the mind and the body have certain powers, or ability to act and do. The powers relating to the body are known as physical, and those pertaining to the mind as psychical, both showing close dependence upon each other. All the powers of the mind are grouped in three classes, known respectively as intellect, sensibility, and will. The intellect comprises the powers by which we are able to know; the sensibility, those by which we feel; and the will is the power by which we choose and execute. This division of mental powers does not imply that the mind is composed of organs or parts. On the contrary, it is one indivisible thing. It is the mind as a whole that knows, feels, and wills. There is a close relation between the body and the mind, but the relationship is especially intimate between the mind and the nervous system, particularly the brain. It is not difficult to realize this relationship when we contemplate the effect that a severe physical pain, such as toothache or a wound, has upon the mind, or what influence mental exhaustion exercises on the bodily functions.

CULTURE OF THE INTELLECT. The intellect, being the power to know, cannot be cultivated without bringing the mind in contact with objective realities. An object that has no real existence cannot be known, though psychical objects are considered as real as the objects of material nature. Among the objects of knowledge are the acts and states of the mind; the product of mental acts, such as concepts and thoughts; and external material objects. Writers generally agree that we can be conscious only of our mental acts and states, that we know only what we can recall into consciousness, and that the degree of consciousness is increased by applying the mind vigorously to the acts or states perceived. The power of selfdirection possessed by the mind is called the attention, which varies in degree from a slight energy to an intense concentration of the mind on one object to the exclusion of all others. Attention being under the control of the will. it can be cultivated by the exercise of will power over the movements of the mind. An enlargement of ability to apply attention is followed by greater power of perception. The whole process of acquiring knowledge involves a succession and network of mental activities. These include sensation, discrimination, perception, analysis and synthesis, comparison, judgment, conception, and reasoning.

Sensation comprises the conscious state resulting from the action of some organ of sense under nervous stimuli, and is the first step in acquiring knowledge. Discrimination is the discernment of distinctions while the mind is undergoing sensations, thus leading to a perception, which may be defined as the power of acquiring immediate and fundamental knowledge. Analysis involves a separation of parts into their elements, while synthesis implies the combining of several constituents to form wholes. The term comparison implies the discernment of likeness and unlikeness between several objects, thus leading to the formation of a primary judgment, and ultimately to conception and reasoning. Though the acquirement of knowledge depends to a large extent upon the power to give attention, the latter is again dependent upon interest, which invites and sustains attention, and thus bears directly upon successful study. Memory represents to the mind objects previously known, while imagination represents objects not as they are or were, but as they may be or might have been. Both are susceptible of training, and by right use constitute elements of vast importance in mental culture.

The powers of the intellect may be subdivided into four groups, namely, the presentative, representative, reflective, and intuitive. By the presentative powers we acquire knowledge of the outside world through the five senses—hearing, seeing tasting, smelling, and feeling—and to these some writers add the sense of muscular resistance. The representative powers include memory and imagination, the former involving the two mental acts of reproduction and recognition. The reflective powers make it possible for us to establish the relations and connec-

tion of objects, while the intuitive powers enable us to know certain fundamental facts intuitively. According to most writers, we acquire at least seven fundamental ideas by intuition. They include the idea of space, place, being, time, right, cause, and personal identity, each ot these being as self-evident as the truth that a part is not equal to the whole, and that a person cannot be in two places at the same time.

SENSIBILITY. Since all feelings are actions or states of the soul, they are classed as psychical. However, those arising in the bodily organism are generally termed corporeal to distinguish them from those originating exclusively in the The corporeal feelings include sensations, appetites, and instincts. Sensations arise from some excitement of the nervous system, while appetites are occasioned by the wants of the body, and instincts attend sensations and appetites, but are not governed by a directing intelligence. The psychical feelings proper are divided into emotions, affections, and desires. It may be said that all feelings are pleasurable or painful, and that they are induced and extended largely by education and early training.

WILL. The will, being the power of choice and execution, enables us to decide upon our conduct and to put forth the necessary volitions. Both choice and execution are necessary to constitute a completed act of the will. It is man's power to use deliberation in making a choice and to exert force in execution that he stands preëminent above all other creatures. Not what a man knows, or what his feelings may be, count as much in estimating character as the choice of conduct and the execution of his designs. Writers do not agree whether man possesses freedom of the will. Those holding that the will is not free generally agree that education, sensibilities, and environments operate to limit and modify, while those of the opposite school think that man has perfect freedom to choose and unlimited power to put forth volition. The responsibility resting upon those who presume to teach and direct in daily conduct should not be underestimated. should be their aim to stimulate the power of the will by wise activity and to inculcate promptness in forming decisions. Only when the will is developed in harmony with the intellect and the sensibility can a definite and stable character result. See Education; Pedagogics.

PTARMIGAN (tär'mi-gan), the name of several species of grouse, differing from the other birds of the same family in that the legs are densely feathered to the claws and the nasal grooves are covered with feathers. They have sixteen to eighteen feathers of considerable length in the tail. In most of the species the feathers become white in winter. They inhabit the northern and snow-covered regions of both hemispheres, where they feed on mosses, lichens, small fruit, and insects. The plumage harmonizes with the rocky barrens in summer and the

snow in winter, and the plumed feet enable them to walk upon the snow without sinking into it. About June the female incubates, but the male assists in rearing and feeding the young. Both fly rapidly with a whirring noise and are swift runners. The females cackle like a hen, but the males have a loud, harsh cry. Two species, the rock ptarmigan and the Welsh ptarmigan, are widely distributed in North America. The former is seen in Greenland and both ranges far north in Canada.

PTERIDOPHYTES (ter'i-do-fits), one of the four orders into which the nonflowering plants are divided, including the ferns, scouring rushes, and club mosses. They are associated with the seed plants, since they are larger in size and display a larger growth of foliage than the moss plants. The general name cryptogams is applied to all plants that do not bear seed, hence the pteridophytes are frequently termed vascular cryptogams. They do not possess a stem, but have real roots. About 4,500 species have been described. The greater number of.

these plants are tropical.

PTERODACTYL (ter-o-dak'til), the name of a genus of extinct flying reptiles, which lived in the Mesozoic or Reptilian age. They included a large number of species and are usually classed as bird lizards or wing lizards. It is presumed that they did not precede the birds, since they appear to have originated from dinosaurian ancestors. These animals had skeletons with hollow bones, fitted to fly, but exceedingly strong, and large teeth were set firmly in the jaws. Later species seem to have lost the development of teeth, but in these the jaws were larger and more powerful. In the larger forms the wings had a spread of twenty feet and some of the species were exceedingly powerful both in water and while flying, though they were less favorably adapted to move about upon the dry ground. The skin seems to have been smooth and uncovered, since no traces either of scales or feathers have been found. Fossil remains are very extensive in some sections and in general are widely distributed, especially in the limestone formations of Europe.

PTOLEMY (tŏl'ē-mĭ), the name of a dynasty of Egypt, which ruled that country from 323 to 30 B. c. These kings were of Grecian origin and succeeded to the throne of Egypt when that country formed one of the divisions into which the empire of Alexander the Great was divided. Ptolemy I., surnamed Soter, upon the death of Alexander in 323 B. C., became ruler of Egypt, which nominally remained a satrapy of Macedon. He is the founder of the great library of Alexandria, and during his reign was built the lighthouse on the island of Pharos. His son, Ptolemy II., succeeded him in 285. He and his successors of this line of kings are noted as patrons of learning and art, the founders and defenders of Greek culture in Egypt. Cleopatra, who belonged to this line, ruled jointly with Ptolemy XIV., her brother, surnamed Dionysus, from 61 to 47 B. c., when a Roman army under Caesar defeated Ptolemy XIV., who was drowned while attempting to escape. The line became extinct with Ptolemy XVI., who was the son of Cleopatra by Julius Caesar. He reigned conjointly with his mother from 45 until 30 B. c., but was put to death by Octavius after the Battle of Actium.

PTOLEMY, Claudius Ptolemaeus, eminent Greek geographer and mathematician, flourished in Alexandria, Egypt, in the 2d century A. D. It is thought that he was born at Ptolemais, a Grecian city of the Thebaid, and that he published the result of a line of astronomical and geographical observations in 139 A. D. Some writers assign a number of discoveries to him as late as the year 161, though it is certain that his chief work, "Megale Syntaxis tes Astronomias," was published at an earlier date. This work is known among the Arabs as "Almagest," meaning the greatest, and includes some of the most valuable early discoveries in astronomy. The "Geographike Hyphegesis" is a noted geographical work in eight books, besides which he published a catalogue of fixed stars and a number of treatises on astrological subjects. He maintained the Ptolemaic system of astronomy in his "Almagest," which was so named because he was its most eminent expounder.

The theory of Ptolemy assumes that the earth is a fixed body, remaining constantly at rest in the center of the universe, with the sun and moon revolving around it as attendant satellites. The more complicated movements of the planets were represented by a contrivance illustrating each planet as revolving in a great circle called a deferent, while within the great circles revolve the centers of small circles called epicycles, the latter immediately surrounding the planets, and each member of the system having its own deferent and epicycle.

PTOMAINE (to'ma-in), the name of certain poisonous substances found in animal matter while in the state of decay. It resembles in its properties the vegetable alkaloids. The ptomaines are the products of microbe organisms

PUALLUP, a city of Pierce County, Wash., 10 miles southeast of Tacoma, on the Northern Pacific and other railroads. It is in a fertile section and has a large shipping trade in fruit. The features include the high school, public library, and electric railways. The place was settled about 1887. Population, 1910, 4,544.

PUBLIC SCHOOLS. See Education. PUCK, or Robin Goodfellow, the name applied in England to a fairy. It corresponds to the Knecht Ruprecht of Germany, the Nisse Goddreng of Scandinavia, and the Brownie of Scotland. Shakespeare employs Puck as a prominent figure in his "Midsummer Night's Dream." Writers generally regard the term applicable to all species of sportive fairies which

are capable of serving in domestic relations, but generally characterized by their jovial and merry pranks. They are represented in literature as of small stature, affectionate to the beautiful, mischievous to the housemaids, and easily induced by kindly gifts to serve in performing many household duties. A widely read illustrated weekly periodical published in New York

City has adopted Puck as its name.

PUEBLA (pwa'bla), a city of Mexico, capital of the state of Puebla, 68 miles southeast of the City of Mexico. It is located on a fertile plain about 7,000 feet above sea level, has railroad connections, and is the center of a large trade in agricultural produce and manufactures. The streets are regular and wide, intersecting each other at right angles. has many substantial buildings, including the museum, the theater, several colleges, and a splendid cathedral. The manufactures have long been among the most important of Mexico. They include cotton and woolen goods, boots and shoes, glass, leather, soap, earthenware, and machinery. The city was founded in 1533 by the Spaniards. Santa Anna made an unsuccessful effort to capture it in 1845 and Maximilian reduced the place on May 17, 1863, after a siege of two months. Population, 1910, 101,214.

PUEBLO (pwěb'lo), a city of Colorado, county seat of Pueblo County, on the Arkansas River, 115 miles south of Denver. Communication is furnished by the Missouri Pacific, the Colorado and Southern, the Denver and Rio Grande, the Chicago, Rock Island and Pacific, and the Atchison, Topeka and Santa Fé railroads. It is the second city of the State and one of the most prosperous cities between the Rocky Mountains and the Missouri River. It has electric and gas lighting, public waterworks, sanitary sewerage, well graded and paved streets, and electric street railways. Among the noteworthy buildings are the county courthouse, the city hall, the high school, the McClellan Public Library (in a Carnegie building), the State insane asylum, and many fine schools and churches. The City Park and the Mining Palace Park are among the fine public resorts.

Pueblo is surrounded by a region which produces gold, silver, and other minerals. It has a large wholesale and jobbing trade. The manufactures embrace wire, furniture, lumber products, carriages and wagons, farming implements, mining machinery, hardware, and earthenware. It is the seat of important railroad shops and smelting works. The vicinity was first settled by the Mormons in 1846 and soon after became a trading post. It was platted in 1859 and incorporated in 1873. Population, 1900, 28,157; in 1910, 44,395.

PUEBLO INDIANS, the inhabitants found by the Spaniards in Mexico, New Mexico, and Arizona, when exploring that region in the 16th century. Their state of society was of a semicivilized character at the time of the discovery of America. They lived in villages and the tribe was divided into four groups, each speaking a different dialect. The men were about five feet tall, the women were somewhat smaller in stature, and their complexion was a fair olive. Their dwellings were largely in villages. They engaged in agriculture, mining, and manufacture. The villages were built in the form of rounded or oblong squares, and some of their habitations were large enough to contain a number of families, being several stories high and in many cases from 200 to 500 feet long. These dwellings were made of sun-dried brick with crossbeams and finishing of wood, and in them were apartments for different families of the tribe, each occupying an eating and a living room, a store room, and a kitchen. To provide against attacks of enemies, they made no doorways or entrances in the lower stories, but entered the dwellings by means of ladders from the roof or through upper apartments.

The Pueblos were skilled in weaving and spinning. They made pottery, baskets, utensils, and building material, and were considerably advanced in cultivating the soil. Many of their villages may still be traced and there are evidences of vast systems of irrigation in some parts of Arizona and New Mexico, indicating that they conducted the water by dams, ditches, and embankments for many miles to supply sufficient moisture for the germination and ma-turity of crops. Their clothing was made of cotton, fur, fibers derived from bark, and feathers. The weapons consisted of stone axes, lances, flint knives, bows, and javelins, and the warriors wore helmets and shields of the skins of animals. It is evident that they possessed considerable advancement in the use of medicines, had a system of instruction, and conducted

spiritual worship.

When the Spaniards conquered Mexico, fully 30,000 Pueblos were resident in Mexico and the regions immediately north. It is evident that large numbers of these people resided in Texas, Utah, Colorado, and Nevada at different times, since many ruins of houses and villages have been discovered, some being now covered by sands. It is thought that they were prevented from spreading farther to the north by hostile Indians and that they were driven from their northern possessions in different periods. Some writers think that the cliff dwellers were the ancestors of the Pueblos, since many ruins of cliff dwellings discovered in the cañons of Mexico, Arizona, and Colorado bear some marks of similarity to the dwellings constructed by the Pueblos.

Among the noted cliff dwellings are those of the San Juan cañon, where remarkable habitations were occupied fully 1,000 feet above the Mancos River. In other places clusters of dwellings were constructed upon terraces formed by the wearing away of the soft strata of limestone or sandstone. Some of these dwellings occupied a position between upper and lower terraces, the two forming a natural floor and roof, while the openings were faced with walls of sun-baked brick and coated with a natural cement to closely resemble natural cliff formations. At present there are about 10,000 Pueblos, who are direct descendants of those discovered by the Spaniards, and their modes of living and industries closely resemble those of their ancestors. Most of the Pueblo settlements are in the valley of the Rio Grande and the valleys of its tributaries. Among the most important villages is Zuñi, situated near the western boundary of New Mexico, and in the northeastern part of Arizona are the seven Moqui villages. Christian missionaries have induced some to embrace Christianity, but the greater number still hold to their ancient traditions, though their civilization and industries have been materially affected by the teachings of the whites.

PUERTO PRÍNCIPE (pwar'to pren'se-pa), a city of Cuba, capital of the province of Puerto Príncipe, 300 miles southeast of Havana and 25 miles from the Atlantic Ocean. A railroad connects it with Nuevitas, its port on Nuevitas Bay, an inlet from the Atlantic. It is surrounded by a fertile country and yields sugar, tobacco, cereals, and cattle. The features include the post office, the cathedral, the townhall, the railway station, and the ruined military post. Among the manufactures are cigars, clothing, earthenware, and utensils. It has a growing trade and good municipal improvements. Popu-

lation, 1908, 29,481.

PUFENDORF (puf'en-dôrf), Samuel, philosopher and clergyman, born in Chemnitz, Germany, Jan. 8, 1632; died Oct. 26, 1694. He first studied at Grimma and later at Leipzig and Jena. Soon after completing his studies at the latter university, he became tutor to the son of the Swedish ambassador at Copenhagen. In 1661 he accepted the chair of Roman law at Heidelberg, where he attained remarkable success by his eloquence and careful devotion to the subject-matter of instruction. He accepted the professorship of law of nations at Lund, offered him by Charles XI. of Sweden, in 1670, and in 1677 became historian to the King of Sweden with the dignity of counselor of state, and took up his residence at Stockholm. In this capacity he published a history of Sweden from the expedition of Gustavus Adolphus into Germany to the death of Christina.

The Elector of Brandenburg invited him to Berlin in 1688, where he wrote the history of his life and reign, which was published in nine-teen volumes. It was his intention to resume historical writing in Sweden, but his death occurred at Berlin. Pufendorf exercised remarkable industry in gathering material for his work, for which purpose he drew largely from archives, and the genius with which he labored portrayed the marks of great intellectual power. Among his publications are "History of Charles Gustavus," "History of the Principal States of Europe," "History of Sweden from the Expedition of Gustavus Adolphus into Germany to the Death of Queen Christina," "Life and Reign of the Elector of Brandenburg, Frederick William," and "Spiritual Monarchy of the Pope." The King of Sweden made him a baron in 1694.

PUFF ADDER, a species of poisonous serpents native to Africa, but most abundant in the regions south of the Equator. It is one of the most dangerous serpents of Africa. The length is from four to five feet, and it is quite thick in proportion to its length. It is so named because when irritated puffs appear on the upper part of its body. The Bushmen poison their

arrows with its venom.

PUFFBALL, the name of any fungus of the genus lycobudon, so called from the shape and from its puffing out dark colored dusty spores when the matured plant is broken open. Puffballs grow in roundish form on the ground or on decaying wood, and when immature have a firm and fleshy interior, which later becomes a powdered mass. The spores are borne in cavities in the interior of the globular mass, and, when the surrounding tissues become dried and ruptured, they escape in the form of fine dust. Some species grow without a stem, while others appear at the upper part of a fleshy prominence and often acquire a circumference of several feet. Many are edible and their fumes are used in some countries instead of chloroform for anaesthetic purposes.

PUFFIN (puf'fin), a genus of diving birds of the auk family, native to the Arctic and northern temperate regions. The bill is deep and excessively compressed, with naked skin at the outer and back part of the mouth, and the upper mandible extends to the top of the head both mandibles being transversely grooved. The wings, tail, and legs are short, and, like the auks and penguins, they rest or sit in an upright position. Though able to fly rapidly, they cannot sustain long flights, but have much skill in swimming and diving. The puffins are migratory birds and are seen in large flocks. They feed on fish, insects, and many forms of shell life. The flesh and eggs are alike wholesome for food. Thousands of puffins may be seen in the North Atlantic and Pacific oceans. especially in Kamchatka and the Kurile Islands.

PUG, the name of a small breed of dogs which is grown chiefly for use as a house pet. The nose is short, the forehead is wrinkled, and the hair is short. Most of the full-blooded specimens have a fawn color, while the body is stout and the eyes are large. This breed of dogs seems to have been brought from the East Indies to Holland, whence it was taken to other

countries and finally to America.

PUGET SOUND (pū'jět), an inlet from the Pacific Ocean, on the northwestern coast of Washington, which it separates from the island of Vancouver. It is the southern continuation of the Strait of Juan de Fuca and Admiralty Inlet, has a coast line 280 miles in length, and contains a number of important islands and bays. Ships of the largest size may sail safely in all parts of the sound, since its shores are high, and deep water extends very near to the land. The surrounding country is fertile and richly timbered, while canal and railroad improvements have greatly enlarged its commercial importance. The principal cities on its shores are Olympia, Tacoma, and Seattle.

PUGH, James Lawrence, statesman, born in Burke County, Georgia, Dec. 12, 1820; died March 9, 1907. He accompanied his parents to Alabama in infancy, where he received an academic education, and in 1841 was admitted to the bar. Soon after he became a member of the State senate and in 1859 was elected to Congress, but retired when Alabama seceded from the Union in 1861. He was elected to the Confederate Congress in the same year and was reëlected in 1863, but served as a private in the Confederate army. In 1875 he aided in framing the State constitution and in 1880 became a member of the United States Senate, to which he was reëlected in 1884 and in 1890. Pugh was a leading and influential member of Congress and took part on many important committees and in several notable debates.

PULASKI (pů-lăs'kĭ), Casimir, Polish count and patriot, born in Podolia, Russia, March 4, 1748; died near Savannah, Ga., Oct. 11, 1779. He was an active opponent of Russian oppression and joined his father and brothers in opposing King Stanislaus Augustus. After the death of his father, he became leader of the insurgent forces, and in an attack on Warsaw attempted to capture the king, but, being defeated in battle, he was required to seek safety by fleeing to France. He met Benjamin Franklin while in Paris, in 1775, and two years later joined the American army at Philadelphia against the British. Congress made him brigadier general for distinguished services in a number of engagements, particularly at the Battle of Brandywine. He entered Charleston with his command of infantry in May, 1778, and on Oct. 9, 1779, was mortally wounded at the siege of Savannah. He was taken on board the United States brig Wasp, on which he died two days later, and his body was buried at sea. A monument was erected to his memory by the citizens of Savannah.

PULITZER (pū'lĭt-sēr), Joseph, American journalist, born in Budapest, Hungary, April 10, 1847. He studied in his native city, but came to America while yet a youth, and soon engaged as reporter on the Westliche Post, Saint Louis, a German periodical which was under the editorial charge of Carl Schurz. His able and efficient service soon made him managing editor and later proprietor of the journal. He became a member of the Missouri Legis-

lature in 1869, supported Horace Greeley for the Presidency, and in 1884 was elected to Congress as a Democrat. In the meantime he founded the Saint Louis Post-Dispatch, which

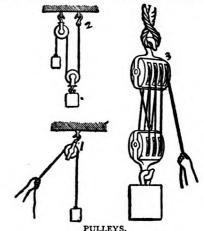
he made a factor in State politics. His journalistic work caused him to resign his seat, giving his entire attention to the publication of the New York World, which he purchased in 1883. This periodical had only a limited circulation, but the untiring energy of Pulitzer placed it



JOSEPH PULITZER

on a profitable and influential basis until it became one of the most popular journals of modern times. He erected one of the tallest edifices in New York City, the World building, and founded, in 1903, a school of journalism at Columbia University. In 1909 he and others charged the administration of President Roosevelt with corruption in purchasing the French holdings in the Panama Canal, which resulted in a long controversy. He died Oct. 29, 1911.

PULLEY (pul'ly), one of the six simple machines or mechanical powers. It consists of a grooved wheel mounted in a block and is used



to increase power and transmit it, by means of a rope or flexible cord, in a changed direction. The ends of the axis of the wheel are supported by a framework called the block, and a groove cut in the edge of the wheel prevents the rope from slipping off when it is put around the pulley. Pulleys may be fixed or movable as shown in the accompanying figures; the former are those in which the block containing the pulley is fixed, as in figure 1, while the block in the latter class is adjusted to move with the

raising or lowering of the rope, as shown in figure 2. There is neither gain nor loss of power with a single fixed pulley; for, as the tension in every part of the rope is the same, if a weight be suspended at one end, an equal weight must be applied at the other end to maintain equilibrium. Hence, the effect of a fixed pulley is simply to give advantage in changing the direction of a force. However, by combining several pulleys in various ways, an instance of which is shown in figure 3, it is possible to gain purchase or mechanical advantage, this depending more or less upon the mode of combination and the number of pul-

leys utilized. The advantage of a system of pulleys may be computed by comparing the velocity of the weight raised with that of the moving power; hence, it may be considered that a single movable pulley gives a mechanical advantage equal to two, or the weight may be said to be twice the power. A single fixed pulley is considered a lever of the first class, a single movable pulley is a lever of the second class, and in combinations the utility of both is more or less exemplified. In theory the advantages are increased as the movable pulleys are multiplied in combination, but advantages that would ordinarily result are to some extent overcome by the friction caused by imperfect flexibility of the ropes. This is due also in part to the friction of the pulley sheave upon its axis, which is now quite largely overcome by making the framework of iron or steel and adjusting the axis so that ball bearings may be utilized. The term pulley is variously applied in machinery, particularly to a wheel on which a band or belt runs for changing the direction of motion, or one in which power is transmitted to or from different parts of the machinery.

PULLMAN (pul'man), George Mortimer, inventor, born in Chautauqua County, New York, March 3, 1831; died Oct. 19, 1897. obtaining a general education, he engaged as a mover of houses and in 1853 contracted to move warehouses along the Erie Canal, which was being widened at this time. He settled in Chicago in 1859, where he contracted to raise brick and stone business blocks without disturbing the business of the occupants. This work was done successfully by a system of jackscrews, and the buildings were thus brought to conformity with the graded streets. In 1863 he turned his entire attention to the building of sleeping coaches and soon after organized the Pullman Palace Car Company. The business increased with such rapidity that he founded the industrial town of Pullman in 1880. This town is situated fourteen miles south of the center of Chicago, near Lake Calumet, and covers an area of 500 acres. It is finely platted, has modern municipal facilities, a circulating library, and is the seat of vast manufacturing enterprises. It is not only supplied with all the best sanitary conditions, but modern conveniences and the social and educational welfare have been kept in mind. In 1890 the town of Pullman was incorporated with the city of Chicago. Mr. Pullman designed the vestibule train, by which the separate coaches of an entire train are united by connections forming safe and convenient passage to all the cars. He was president of a company that constructed the metropolitan street car system of New York City and promoted many other enterprises. One of his sons, George M. Pullman, died at San Mateo, Cal., Nov. 28, 1901. He was born June 26, 1875.

PULQUE (pul'ka), a vinous beverage made in many sections of Spanish America, especially in Mexico, by fermenting the juice of several species of the agave. It is milky, resembling thin buttermilk, and has a sour taste and an ill smell to those not accustomed to its use. The maguey species of agave, also called the American aloe, is used mainly, since it contains the greatest amount of sugar, and the pulque is made by fermentation.

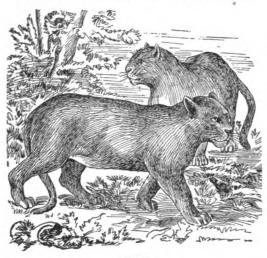
PULSATILLA (pŭl-sā-tīl'la), or Pasque Flower, a genus of flowering plants native to Europe. The species are perennial, have bell-shaped flowers of a bluish color, and bear long, feathery awns on the fruit. The plants are narcotic and acrid. They yield a preparation known as pulsatilla, a medicine used in catarrhal inflammation, bronchitis, and other ailments. The flowers yield a bluish-purple coloring matter used quite largely in preparing Easter eggs.

PULSE, the beating of the arteries, due to the passage of the blood waves caused by the successive contractions of the heart. It is noticeable, more or less, in many parts of the body in the state of poor health, but during health it is present only in the arteries, and may be felt by placing a finger lightly upon an artery running over a bone, as the radial at the wrist, or the temporal in front of the ear. The pulse varies at different ages and under different conditions. At birth the number of beats is about forty per minute; at the end of the first year, 120; at the end of the second, 110; during middle life, between 70 and 80; and in old age, usually a little more. Males have from five to eight beats less than females. The pulsations are more numerous during excitement or exertion, but they are noticeably diminished while reclining or sleeping. The force and rate of pulsations are taken as an indication of the condition of health, but they cannot be considered reliable symptoms of a particular disease without considering other conditions. In some diseases, particularly those affecting the heart, it is not infrequent for the pulse to beat as low as 25 pulsations per minute, while in fevers and other ailments they sometimes reach 200. In diseases of the brain or organic affections of the heart, it is quite common to notice

much irregularity of the pulse, though it is natural to some persons to have irregular pulsations. An irregular pulse is due either to the motions of the artery being unequal in number and force, a few beats being from time to time more feeble than the rest, or to a pulsation being left out entirely, thus causing intermission of the pulse from time to time.

PULTOWA. See Poltava.

PUMA (pū'mà), or Cougar, an American carnivorous mammal, ranging from Canada to Patagonia. It has a reddish-tawny color above



PUMA.

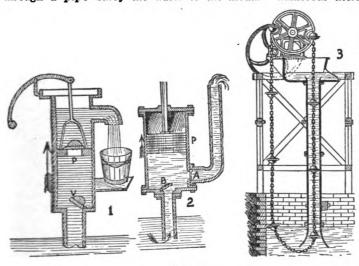
and paler she jes beneath. The adult is about three feet lingh and four feet long, measured from the nose to the tip of the tail. The puma is an expert climber, but is not confined to the timber districts. It is seen frequently among shrubs a'ong the banks of rivers and on the open prairies and pampas. Its habits are much like those of the leopard, killing many more of the animals upon which it preys when convenien than it is able to devour, either for the sake of securing warm blood or gratifying an instinct to destroy. Pumas prey on cattle, sheep, swine, and other domestic or wild animals, but rarely attack man. When pursued they seek safety by ascending lofty trees. The name cougar was first applied by the French, while the Spaniards still call it leon, and hunters of the United States know it generally as panther. The puma may be domesticated with little difficulty.

PUMICE (pum'is), a light mineral substance of volcani origin, formed under the action of bubbles of steam or gas which accompany lava during a liquid state. It is highly porous and may be said to be a spongy, frothlike lava. Pumice is found principally in the vicinity of volcanoes, whence it was ejected, and its color is whitish or gray, though there are slate-blue and reddish tints. Its numerous pores render it so light that it floats readily on the surface of water, sinking only after being thoroughly saturated. Pumice is obtained largely from Iceland, the Lipari Islands, at Andernach on the Rhine, and the volcanic regions in America. It is of value in polishing ivory, wood, leather, marble, bone, and metals.

PUMP, an apparatus for raising, exhausting, compressing, or circulating a fluid by drawing or pressing it through pipes or apertures. Many varieties of pumps have been invented, differing more or less in construction according to the purposes for which each is intended. The most important are the suction pump, the lifting pump, the force pump, and the centrifugal or rotary pump. The suction pump is the most common of these four classes and is in general use for household purposes. It has a piston that works air-tight within a hollow cylinder or barrel, which is moved up and down by a handle connected to the piston rod, and has a valve (P) opening upward, as is shown in figure 1. Another valve (V) opening upward is at the bottom of the barrel, and, as the piston is raised, a vacuum is left below it in the pump barrel, into which the water of the well is forced by the pressure of the air. As the piston descends the valve at the bottom of the barrel closes and the valve in the piston opens, thus making a passage for the water above the piston. By successive movements of the piston the water reaches the mouth of the pump and escapes.

The suction pump and the force pump cannot exceed about 35 feet, since a column of water of that height exerts a pressure equal to that of the atmosphere, though in practice pumps seldom raise water higher than 28 feet from the lower valve to the level of the wall. The lift pump is not limited in this way, since in this class of pumps the tube is placed a considerable depth into the well, and the piston is near the bottom of the pump tube. In the piston is a valve opening upward, thus allowing the water in the well to pass through it, and when the piston is drawn up its valve closes, while the valve near the mouth of the pump allows the water to pass through it, but when the piston descends it closes and does not permit the water to return. Thus, by a succession of movements, the water may be lifted from any depth, but the weight of the water makes it quite laborious to operate a lifting pump from great depths.

The force pump is used to force water into the higher stories of buildings, into standpipes or reservoirs of city waterworks, and to throw water over gardens or burning buildings. It has a solid piston that works air-tight in a tube or box (P) at the top of the pump barrel, and, as it is moved upward, the water rushes into a vacuum beneath it. When the piston or plunger moves downward, the lower valve (B) closes, while the valve (A) in the side pipe opens before the water that is forced outward by a pressure equal to the downward pressure of the piston. Force pumps are made also with double action, thus causing a continuous stream to flow from the mouth of the pump. The chain pump is used successfully where the supply of water near the surface is abundant. It consists of an endless chain passing over two fan-shaped wheels, one at the botton of the well and the other at the surface. As the chain is put in motion by a crank the cups passing upward through a pipe carry the water to the mouth



PUMPS. 1, Suction Pump; 2, Force Pump; 3, Chain Pump.

of the pump. Centrifugal, or rotary, pumps are capable of lifting large quantities of water at short distances, and consist of a fan-shaped wheel that is rotated rapidly in a casing. The wheel is connected with the water by a pipe, and the rapid movement causes the water to flow by means of centrifugal action.

PUMPKIN (pump'kin), a trailing plant of the gourd family native to India, but now naturalized and cultivated in practically all countries. The leaves are heart-shaped, the flowers are large with yellow petals, and the vine often grows to a length of ten to twenty feet. Many species of pumpkin are grown, the fruit ranging in size from a few inches to two feet in diameter. The seeds are situated in rows within the fruit. They are small, white, and flat, and yield valuable medical properties useful in cases of tapeworm. Pumpkins are cultivated extensively in many localities of North America for domestic food and as food for cattle. The fruit is yellow or reddish. It is used in making pies and butter and is eaten when baked.

PUNCH, a tool for indenting or perforating sheets or plates of various materials, such as iron and steel, and for driving out or in an object inserted in a hole. It is usually made of

steel and its shape depends upon the uses for which it is intended. Punches for cutting steel pens, buttons, jewelry, and other similar articles are hollow and sharp-edged, while those for stamping dies, perforating, and driving objects into or out of metallic plates are solid. The name funch is applied to an alcoholic beverage made of wine and spirits. It is sweetened and flavored with orange or lemon, and commonly diluted with water. The London Punch is a weekly magazine devoted to comic, satirical, and humorous literature. It was founded in 1841

by Mark Lemon and Henry Mayhew, and is now as important in the publication of comic sketches in prose, verse, and caricature as is the Puck in America or the Kladdera-

datsch in Germany.

PUNCH AND JUDY, or Punchinello, in Italian Pulcinella, a popular puppet show of Italian design. Its origin is ascribed to Silvio Fiorello, a comedian who flourished about the middle of the 17th century. The principal figures are Punch and Judy, two cleverly contrived puppets worked by a person within a box, while a second person stands on the outside to keep up the dialogue, which is carried on with the person inside, though it is represented that the figures do the talking. Punch and Judy

represent various scenes in domestic and public life, though generally a man and his scolding wife, the latter being carried off by a policeman

or demon as the closing scene.

PUNCTUATION (punk-tu-ā'shun), the art of dividing written discourse into sections by means of points for the purpose of marking the grammatical connection and dependence, and making the sense more obvious to the eye. In ancient writing words run together successively without break or pause, though in the later specimens points are used for oratorical purposes. Aristophanes, the Greek grammarian of Alexandria, invented a system of punctuation, but this was forgotten to such an extent that Charlemagne employed several scholars to restore it. Aldus Manutius, a printer of Venice, Italy, in the latter part of the 15th century invented the main features of the modern system of punctuation. As there is no arbitrary punctuation, it is necessary to exercise good judgment and taste for the purpose of avoiding defects, ambiguity, or confusion in the construction of a sentence. A sentence unpointed and unspaced in the manner of the ancients is difficult to read, and at first sight appears to be written in an unknown tongue. The following is an example of the two methods, one written

solid, and the other properly spaced and punctuated: Readingmakethafullmanconferenceareadymanwritinganexactman. Reading maketh a full man; conference, a ready man; writing, an exact man.

The chief use of punctuation is to divide discourse into sentences, and these again into parts, in a manner so as to show the relation of the several parts to each other. It is based largely on grammatical analysis, requiring accurate discrimination. A change in the punctuation of a sentence generally produces a change in the meaning. This is nicely illustrated by an incident connected with the proceedings of the English House of Commons, where a member was required to publicly apologize for calling another a liar. This he did, while standing in the "I said presence of the body, in these words: he was a liar, it is true; and I am sorry for it." The apology was generally accepted as satisfactory, but a London newspaper gave it a different meaning by publishing it in this manner: "I said he was a liar; it is true, and I am sorry for it." Another example of the necessity of care in punctuation is the following:

John Keys, the lawyer, says he is guilty. John, Keys the lawyer says he is guilty. John Keys, the lawyer says he is guilty. "John Keys the lawyer," says he, "is guilty."

The principal European languages employ six chief points in punctuation. These include the period (.), placed after every declarative or imperative sentence and after every abbreviated word; the comma (,), employed to denote the least degree of separation, and for separating the members of a compound sentence and dependent clauses; the semicolon (;), used to separate parts of sentences less closely connected than those separated by commas; the colon (:), employed to separate parts of sentences less closely connected than those separated by the semicolon; the interrogation point (?), used to show that a question is asked; and the exclamation point (!), used to indicate some emotion.

Many miscellaneous marks are used for different purposes in writing. These include the dash (-), employed to indicate an omission, a sudden pause, a sudden or abrupt change in the construction of a sentence, and sometimes to add effect to other marks; the parentheses (), used to inclose words that break the unity of the sentence; the brackets [], employed to inclose some word or words necessary to explain or correct an error; the quotation marks (""), used to inclose quotations from the language of another person; and the apostrophe ('), employed to indicate the omission of a letter. The section (§) denotes the small divisions of a book or chapter, the ellipsis (****) indicates the omission of words, and the caret (A) is used to show that something has been omitted. Various marks are employed to refer to marginal notes, such as the asterisk (*), the dagger (†), the double dagger (‡), the section (§), the paragraph (¶), and the parallel (||). The index (🖼) is used to designate some important statement or sentence, and dots (....) indicate that words have been omitted from a quotation.

PUNIC WARS (pū'nīk), the name of three great wars between the Romans and the Carthaginians. The First Punic War was a contest for the possession of Sicily. It covered a period of 23 years, from 264 to 241 B. c., and was finally won by the Romans. Hannibal instigated the Second Punic War to capture Saguntum and other territory. It began with the great invasion of Italy in 218 and ended by the Roman victory at Zama in 202 B. c., lasting a period of 16 years. The Romans undertook the Third Punic War with the intention of destroying Carthage and thus humiliate its rival. This war lasted three years, from 149 to 146 B. C. Although Carthage made a most heroic defense, it was utterly destroyed never to rise again.

PUNJAB (pun-jäb'), or Panjab, the most northerly province of India, so called because the region is drained by the five tributaries of the Indus-the Ravi, Beas, Sutlej, Chenab, and Jhelum rivers, the word Punjab meaning five rivers. The province is somewhat larger than the Punjab proper. It lies immediately east of Afghanistan and Beluchistan, south of Cashmire, west of the Northwest Provinces, and north of Rajputana and Sind. It has a total area of 110,675 square miles. Ranges of the Himalayas traverse the northern part, but in the southern portion the surface is either level or undulating and consists of a great alluvial plain. Extensive deposits of rock salt and alum beds abound, and there is an abundance of limestone for building purposes. The principal products are tobacco, wheat, barley, opium, rice, cotton, sugar cane, maize, indigo, tea, and flax. Valuable forests are abundant, but there is a scarcity of rainfall in some sections, making it necessary to irrigate from wells and reservoirs in a portion of the region. Lahore, the capital, is situated in the center of the province. Other cities are Delhi and Amritsar. Manufacturing enterprises are successfully carried on in the cities. It has extensive interests in rearing live stock, including camels, cattle, sheep, and goats. The people are mostly Mo-

hammedans. Population, 1918, 22,346,108.

PURDUE UNIVERSITY, a coeducational State institution at Lafayette, Ind., established in 1869 and so named from John Purdue. It embraces departments of civil engineering, agriculture, science, pharmacy, electrical engineering, and mechanical engineering. Admission is upon examination or a certificate from a commission school. Students are required to do shop and field work in addition to pursuing the usual branches of study. It has a campus and a farm of ninety acres, a library of 45,000 volumes, and property valued at \$2,100,000. The average attendance is about 1,850 students.

PURGATORY (pûr'gà-tô-rỹ), a place of purgation or punishment in which Roman Catholics believe the souls of the just expiate the offenses committed in this life. They think that every sin, no matter how slight, deserves and will receive punishment either before or after death. While the guilt of sin and the eternal punishment due to grave offenses are removed by the absolution of a priest in the sacrament of penitence, the temporal penalty which has to be undergone as a satisfaction of God's justice yet remains. Purgatory is a middle state for such as do not deserve hell and are yet not sufficiently pure to enter heaven. While in purgatory the souls are believed to receive relief from suffering through the prayers of the living. The Greek Church admonishes its members to pray for the dead, but does not believe in purgatory, and the doctrine is wholly rejected by the Protestants.

PURITANS (pū'rĭ-tanz), the name first applied in England, in 1564, to a class of Protestant members of the Church of England who desired to purge more completely the Roman Catholic ceremonies from the practice of the church. The liturgy and discipline arranged by Archbishop Parker still retained certain features of the Roman Church, which the Puritans wished to eradicate without destroying the existing establishment. They differed from the Separatists, or Independents, in that the latter preferred to abandon the established church. Among the Separatists were the Pilgrim Fathers who came to Massachusetts. Later the Puritans became either Presbyterians or Independents, both in England and the new settlements of America, and their spirit was one of severe moral earnestness, united with a Calvinistic theology.

The spirit of Puritanism exercised a marked influence on the policy of England in the reign of James I. and Charles I., both making vigorous efforts to exterminate it, but its power grew even more important when Laud and Charles sought to abridge the national liberties of the people. Cromwell was the recognized representative of the Puritans, and his triumph was made possible by the devoted efforts of Puritans in the Parliament and in the army. Many Puritans emigrated to America after the return of episcopacy with the restoration of 1660 and the Act of Uniformity of 1662. They are the founders of the New England states. The opposition to amusements grew into a spirit of persecution, but it began to relax at the beginning of the 18th century. Puritanism was the most rigid in New Haven and Massachusetts and exercised a molding influence in Connecticut, Rhode Island, New Jersey, Maryland, and South Carolina.

PUSEY (pū'zĭ), Edward Bouverie, noted clergyman, born at Pusey, England, in 1800; died Sept. 16, 1882. He was the son of Philip Bouverie, younger brother of the first Earl of

Radnor, who assumed the name of Pusey, and in 1822 graduated from Oxford. Soon after he became fellow of Oriel and was appointed professor of Hebrew at Oxford in 1828, a position he held until his death, and to which a canonry at Christ Church was attached. He visited Germany with the view of studying religious movements and published his first work, entitled "State of Religion in Germany." In 1835 he joined Newman and Keble in publishing "Tracts for the Times." The vice chancellor of Oxford suspended him in 1843 from the ministry for three years on account of preaching a sermon inculcating the high sacramental doctrine on the Holy Eucharist.

When Newman went over to Catholicism, Pusey preferred to remain in the Anglican Church and continued to defend evangelical doctrines with great force by lectures and pen. For more than half a century he ranked as one of the chief members of the Church of England, and in private life as well as in public affairs he practiced the most devout spirit of sincerity and gentleness. His influence extended to the support of churches and societies, while he aided liberally by gifts to the poor. Among the many works from his pen are "Lectures on the Prophet Daniel," "Defense of Church Principles," "Private Confession in the English Church," "Letters to the Archbishop of Canterbury," "Benefits of Cathedral Institutions," "On Holy Baptism," "Councils of the Church," and "Catalogue of Arabic Works in the Bodleian Library."

PUT-IN-BAY, a village and summer resort of Ohio, on South Bass Island, in Lake Erie, forming a part of Ottawa County. It is forty miles east of Toledo, with which it has communication by steamboats. On Sept. 10, 1813, Commodore Perry won a victory over the English under Captain Barclay, the seat of battle being about twelve miles northwest of this place. It is visited during the summer by many tourists and has many fine hotels. Population,

1900, 317; in 1910, 259.

PUTNAM (pŭt'nam), a city in Connecticut, one of the county seats of Windham County, on the Quinebaug River, 25 miles south of Worcester, Mass. It is on the New York, New Haven and Hartford Railroad and is surrounded by an agricultural region. Cargill Falls are in the vicinity. The chief buildings include the public library, the high school, and the Day Kimball Hospital. Putnam has a large trade in lumber and lumber products. Among the manufactures are cotton textiles, woolen and silk goods, boots and shoes, cutlery, machinery, steam heaters, carriages, and trunks. It was settled about 1855 and received a charter as a city in 1895. Population, 1910, 6,637.

PUTNAM, George Palmer, publisher, born in Brunswick, Me., Feb. 21, 1814; died in New York City, Dec. 10, 1872. In 1828 he became a clerk in a bookstore and in 1840 entered the

establishment as a partner, conducting a branch house at London for seven years. He returned to New York City in 1848, where he published Putnam's Magazine with the assistance of George William Curtis, which was merged into Scribner's Monthly in 1870. From 1863 to 1866 he served as collector of internal revenue in New York, but he again entered the publishing business. Putnam aided in founding the Metropolitan Museum of Art, and served on an important committee at the Vienna University Exposition. His published works include "Tourist in Europe," "Index to Universal History," and "Biography and Useful Knowledge."

PUTNAM, Israel, patriot and soldier, born in the part of Salem, Mass., now called Danvers, Jan. 7, 1718; died May 19, 1790. He settled in Windham County, Connecticut, in 1738, where he devoted himself to fruit culture and wool growing. He entered the military service as captain at the beginning of the French and Indian War, serving in the Battle of Lake George. For gallantry as a leader of a band of rangers, he was made major in 1757 and the following year was captured by the Indians, who attempted to burn him alive, but his life was saved by Captain Molang, a French officer. He was exchanged in 1759 and three years later accompanied an expedition to the West Indies, taking part in the capture of Havana. At the beginning of the Revolutionary War he became brigadier, and for bravery at Bunker Hill was made major general by Congress. Putnam commanded at Boston, New York, and Philadelphia, and in 1777 was appointed to defend the highlands of New York. When Clinton captured the forts, Putnam was relieved of his command and spent the following two years in raising recruits for the American army. In 1779 he made a visit to his home, where he was stricken by paralysis and was obliged to give up active military life. Putnam was one of the chief "Sons of Liberty," and was a leading figure in the stirring times that characterized the early part of the Revolution.

PUTNAM, Rufus, soldier, born in Sutton,

PUTNAM, Rufus, soldier, born in Sutton, Mass., April 9, 1738; died in Marietta, Ohio, May 1, 1824. He was a cousin of Israel Putnam, studied mathematics and surveying, and in 1773 was engaged as a deputy surveyor in Florida. At the beginning of the Revolutionary War he became chief engineer with the rank of colonel, and in 1778 aided Israel Putnam in fortifying West Point. He was made brigadier general in 1783, served in the Massachusetts Legislature, and in 1787 aided Governor Lincoln in suppressing Shay's Rebellion. In 1788 he assisted in founding Marietta, Ohio. He was appointed judge of the supreme court of the Northwest Territory in 1789 and United States surveyor-general in 1793, serving until 1803.

PUTREFACTION (pū-trē-făk'shun), the decomposition of animal or vegetable substances, which is generally accompanied by fetid

odors. It is now regarded as a kind of fermentation due to the growth of minute plants called bacteria, which enter the putrescible bodies-that is, those decomposing at a certain temperature in contact with air and moisturein which they grow and multiply. Great numbers of spores of bacteria and kindred organisms are present in the air and water, but they develop most rapidly by the free contact of humid air at a temperature ranging from 60° to 30°. Putrefying animal matters give off more unpleasant gases than vegetable matters for the reason that nitrogen is more abundant in the former. Organic bodies of a higher order are changed in the process of putrefaction into lower organic compounds, but also into such inorganic compounds as ammonia and sulphuretted hydrogen, and into such substances as nitrogen and hydrogen. Putrefaction may be arrested or prevented under various conditions, such as keeping the substance perfectly dry, by the use of antiseptics, by keeping the substance in a temperature near the freezing point, by keeping it in a vacuum, or in a vessel containing air deprived of all organic germs, and by heating to the boiling point and then sealing to keep out all atmospheric air.

PYE, Henry James, poet, born in Berkshire, England, in 1735; died in 1813. He was a son of Henry Pye, studied at Oxford, and became a member of Parliament in 1784. After six years he retired and in 1792 became police magistrate for Westminster. Through the favor of William Pitt he became poet laureate in 1790, but his appointment was ridiculed by literary men. He published an epic in six books on King Alfred. His collected poems appeared under the title "Poems on Various Occasions."

PYGMALION (pǐg-mā'lǐ-uňn), in Greek legends, the King of Cyprus and grandson of Agenor. After making an ivory statue of a young maiden, he fell in love with it, and at his entreaty Venus endowed it with life. Later the maiden became his wife and is noted as the mother of Paphos.

PYGMIES (pig'miz), the persons of very small size, or the tribes of people which are much smaller in stature than the average of mankind. The most notable races of pigmies include the Akka, Batwa, and Obongo tribes of Central Africa. Other similar tribes include the Andamanese and Kalangs in Malaysia. These peoples have a usual height of about four and one-half feet and lead chiefly a pastoral life. Pygmies are spoken of in the fables and legends of Greece, and Homer mentions the attacks of cranes upon them on the coast of Oceanus. Many of the stories regarding pygmies have been regarded fabulous, though they are mentioned by Aristotle as existing near the sources of the Nile. This fact was verified by the German explorer, Schweinfurth, while traveling in Central Africa from 1868 to 1871. See Dwarfs.

PYLE (pīl), Howard, author and artist, born in Wilmington, Del., March 5, 1853. He studied art in a private school at Philadelphia and for some time practiced illustrating in New York City. As an artist, in producing juvenile work, he is foremost among American illustrators. Many of his subjects are from the early colonial period of America and adventures upon the sea. His books include "The Rose of Paradise," "A Modern Aladdin," "Merry Adventures of Robin

Hood," and "The Story of King Arthur and His Knights." He died Nov. 9, 1911.

PYM (pĭm), John, statesman, born near Bridgewater, England, in 1584; died Dec. 8, 1643. He descended from a good family and, after pursuing elementary study, entered Oxford University in 1599, which he left before graduating to study law at the Middle Temple. In 1621 he was elected to Parliament as a representative of the popular party, and there became distinguished as an opponent of monopolies and absolutism favored by the court of James I. He opposed the Duke of Buckingham, a favorite of Charles I., in the famous impeachment trial, and in 1640 became a leader of the

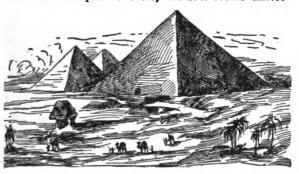
Long Parliament, after that body had been in abeyance for thirteen years. At the beginning of the session Pym delivered an elaborate address, in which he summarized the grievances of the nation and boldly denounced the Earl of Strafford as an oppressor and tyrant. the impeachment trial of Buckingham, which followed soon after, he took a leading part, and succeeded in having a bill of attainder passed upon him. Open hostilities soon followed, which led to the defeat of Charles I. and to his execution. Pym had been appointed as lieutenant of ordnance in 1643, but died about a month later. The remains were buried at Westminster Abbey, but, when

Charles II. was restored, they were removed to

Saint Margaret's Cemetery.

PYRAMID (pĭr'a-mid), an architectural structure of solid masonry, built for various purposes in different parts of the world. The most remarkable pyramids are those of Egypt, situated in a group at Gizeh, near Cairo. group begins at a point nearly opposite Cairo, on the border of the Libyan Desert, and extends southward about 25 miles. They consist of colossal masonry, rising from a rectangular base, and terminating in a point so as to form four triangular sides. The principal material used in their construction is a durable limestone quarried from the hills near by, though there are great slabs and blocks of granite placed on the outside to increase durability, which were evidently taken from quarries at great distances from the location of the pyramids. It is supposed that these structures date from a period between 3000 B. c. and 2300 B. c., and that they were designed mainly as sepulchral chambers of the kings. The most remarkable group consists of nine pyramids about four miles southwest of Cairo, where stood the ancient city of Memphis.

The Great Pyramid belongs to this group and was reared above the tomb of Cheops, the second king of the fourth dynasty. It was originally 481 feet high and 756 feet square at the base, and is counted one of the Seven Wonders of the world. Some of the stones are of remarkable size, and it has long been a subject for speculation as to how the ancients were able to provide mechanical power sufficient to quarry, transport, and elevate them to their proper places. Herodotus, the Greek historian, estimated that it required 100,000 men for a period of ten years to construct a causeway for the transportation of the stone from the quarries for this single pyramid, and that the labor of the same number of men was required for twenty years to complete the structure. The apex of this pyramid was once, quite sharp, but now a flat about three yards square exists at the upper part. It has suffered from removal of a part of the material to construct mosques and temples at Cairo, but still covers thirteen



PYRAMIDS AT GIZEH, EGYPT.

acres and is 451 feet high. A series of steps averaging about three feet in height are at the outer surface, though these were originally hidden by a coating. In the interior are several chambers ornamented with red granite. They may be entered only through an opening on the north side, about fifty feet above the base. Some writers think that this pyramid was built as an astronomical observatory, since the ratio of its height to the perimeter of its base is as nearly as possible that of the diameter of the circle to its circumference, and there are other structural peculiarities in support of this view.

The Gizeh pyramid of second importance is one built by Chafra, third king of the fourth dynasty. It covers about ten acres, has a base 700 feet square, and is 448 feet high. In this pyramid are two sepulchral chambers that were opened in 1816, and, though once incased and ornamented with polished stones, only a portion of the casing remains. The third pyramid of

this group was built by Menkaura, fourth king of the fourth dynasty, and is 354 feet square at the base and 212 feet high. It is the best constructed of the three greater pyramids, and still displays the best evidences of former beauty. The other six pyramids of the Gizeh group are smaller and of less interest. Another noted pyramid is about five miles northwest of Gizeh, at the village of Abou Roash. Several groups are in Nubia, probably built by the kings of ancient Ethiopia. Pyramids of considerable importance are situated in various parts of Assyria, China, India, Greece, and Italy.

The pyramids of Mexico have come down from the time of the Aztecs and rise as four-sided structures. The most important group still existing is at Teotihuacan, twenty miles northeast of the city of Mexico. It includes several hundred structures, but only two of importance. The largest has a base 900 feet square, with a height of 160 feet, while the second is 130 feet high. The most noted of Mexico is that of Cholula, having a length of 1,585 feet and a height of 178 feet. The Mexican pyramids are inferior to those of Egypt and are less remarkable and durable in structure, but all are uniform in facing the cardinal

points.

PYRAMUS AND THISBE (pĭr'a-mus. thiz'be), the two lovers mentioned in the fourth book of Ovid's "Metamorphoses," whose tragi-cal history is introduced as an interlude in Shakespeare's "A Midsummer Night's Dream." The story of these two lovers is that they were tenderly devoted to each other, but parental consent was not given to their marriage, so they met secretly and conversed through an opening of the wall in their adjoining houses. It was agreed at one time that they should meet at the tomb of Ninus, and Thisbe was the first to reach the place of meeting, but a lioness caused her to flee for safety. dropped her robe in the flight, which the lioness at once seized and covered with blood from an ox it had torn to pieces the same day. When Pyramus appeared he discovered the blood-stained robe and concluded that Thisbe had been killed, and, despairing, immediately ended his life. Shortly after Thisbe returned to the trysting place, and, when she discovered the dead body of her lover lying upon the ground, she likewise killed herself.

PYRENEES (pir'è-nèz), the lofty mountain range which separates France from Spain, extending from the Atlantic to the Mediterranean. The mountain range consists of two parallel chains, about 20 miles apart. Its length from the Bay of Biscay to the Gulf of Lyons is 275 miles, and its width is from 25 to 75 miles. Toward the center, nearly midway between the Atlantic and the Mediterranean, are the highest peaks, Mount Maladetta, 11,424 feet, being the culminating point. Only a few passes suitable for wagoning occur in the Pyrenees, but

in 1885 two railway lines were authorized by France and Spain to penetrate the mountains, partly at the expense of each government. These railways are located near the extreme ends of the chains and are in successful operation. The Pyrenees slope most abruptly toward the south, but there are fine springs and health resorts in both countries, and the climate is delightful.

PYRITES (pĭ-rī'tēz), the name of any one of the native metallic sulphides that occur in rocks of all ages. Formerly the name was applied only to sulphuret of iron, but now the term has a general application, and the various groups are designated as iron pyrites, copper pyrites, cobalt pyrites, etc. The pyrites consist of metals compounded with sulphur or arsenic, or with both. The color is yellowish and the consistency is crystalline and hard. Sulphuric acid is derived from iron pyrites; cobalt, from cobalt pyrites; and copper, from copper pyrites. Nickel pyrites has a copper-red color and yields nickel and arsenic.

PYROMETER (pi-rom'e-ter), an instrument for the measurement of high temperatures, ranging greatly above the ordinary thermometers. The first instruments of this kind were based upon the principle that metals expand when subjected to heat, but they proved of comparatively little value for the reason the expansion does not increase proportionally with the rise of temperature. Later graphite was substituted for the platinum rod that was used, and with it a very high temperature may be measured with considerable accuracy. The most accurate instrument is the air thermometer, which is made by placing a column of mercury above a bulk of air in a metallic tube. Since the air expands as the temperature rises, the mercury is carried upward in the tube, and the temperature is indicated by the expansion of the air.

PYROTECHNY (pĭr'ō-těk-nỹ), the art of making and using fireworks. It is of great antiquity and was practiced among the Chinese with much skill before the art became known in other countries. While the Romans used candles, small rockets, and other similar articles, the Chinese developed a system of most brilliant mechanical arrangements, such as movable figures and devices, including those from which the figures of men and animals dart to surprise the company. Many of the forms and devices used in Europe at present are of Chinese manufacture or patterned after their productions. The manufacture of fireworks has grown to considerable importance in the United States, but notable importations are still made from China and Japan. See Fireworks.

PYROXENE (pĭr'öks-ēn), or Augite, a mineral of numerous varieties, composed of calcium, magnesium, and a small quantity of iron or zinc. Other minerals that enter the composition include lime, manganese, soda, and

silicic acid. Minerals of this class are found in limestone and other rocks in which they are crystallized. Many igneous or eruptive

rocks contain pyroxene.
PYRRHUS (pĭr'rŭs), King of Epirus, born about 318 B. C.; slain at Argos in 272 B. C. He was a distant relative of Alexander the Great and was placed on the throne when only twelve years of age, but after five years the crown was transferred to Neoptolemus, his great-uncle. Pyrrhus soon joined the army and distinguished himself in the battle against Antigonus, at Ipsus, in 301 B. C., and thereby recovered his dominion and shared it with his rival. In 295 B. c. he deposed his rival and became sole King of Epirus. After adding parts of Macedonia to his dominion the following year, he joined the Greeks in an invasion of Italy against the Romans, and in 280 B. c. won the celebrated battle on the Siris River, in which he terrorized his opponents by leading a charge with a large number of elephants. This victory cost him many of his best men, and after a second battle he concluded a truce and retired to Tarentum, where he wintered. In 279 B. c. he attacked the Romans in Apulia, and the next year invaded Sicily to expel the Carthaginians, but after several brilliant successes he was repulsed by the latter with great loss. In 275 B. c. he made another invasion of Italy, but was defeated near Beneventum by an army under Manius Curius Dentatus, and escaped to Tarentum witl. only a few of his men. His next enterprise was to invade Macedonia, where he secured a success so complete that the Macedonian troops joined him in a body. Shortly after he invaded the Peloponnesus against the Spartans. His attempt to take Sparta was unsuccessful and he next proceeded against Argos, where he was killed.

PYTHAGORAS (pǐ-thăg'ô-ras), Greek philosopher, founder of the Italic School of Philosophy, born on the Island of Samos about 582 B. C.; died at Metapontum about 500 B. C. He was the son of a successful merchant and spent thirty years in gathering knowledge from the most noted philosophers of Syria, Phoenicia, Babylon, India, Egypt, and other countries. Some writers regard him a disciple of Thales and Anaximander. It is certain that he studied the philosophy of these and other illustrious Greeks, and that he left Samos about 529 B. C. and established his school in Crotona, Italy. Although his school advanced many ideas in radical distinction from those generally accepted, large numbers of disciples were attracted to it by his recognized ability and superior char-His institution resembled a religious brotherhood for moral reformation of society rather than a philanthropical school, and his teachings were rather those of a moral reformer than a scientific instructor, though he gave his attention to political and scientific problems. While in Egypt he learned the doctrine of the transmigration of souls from the priests, of which he became a devoted advocate, and asserted his belief that he had previously lived and passed through other stages of existence. On one occasion, when hearing the howl of a dog, he asserted that he recognized in the sound

the voice of a departed friend.

The school of Pythagoras was represented by 300 members, who were bound by vow to cultivate the rites of their master and to both study and disseminate his philosophy. Its influence was exerted in favor of the aristocratic party, which influenced the democratic party to oppose him in such a manner that he was required to retire to Metapontum. Pythagoras was one of the greatest of early philosophers. He was the first to assume the title of philosopher, meaning lover of wisdom, instead of sophos, meaning a wise man. He based all creation upon the numerical rules of harmony and asserted that the heavenly spheres roll in musical rhythm. His ideas of astronomy were the mosi advanced of those of the early philosophers, for he taught that the sun is the center of the universe, and that the earth and planets move around it in the heavens, a view not generally accepted until 2,000 years after his death. He was commanding and dignified in appearance, taught by discourses in public assemblages, and limited himself to a vegetable food. His teaching before the students was largely scientific and philosophical, while in public he discoursed almost exclusively regarding the relations of mankind from the standpoint of ethics and morals. Since he regarded nature in uniformity with the will of God, he held that human life should make an approach to the harmony of nature. His followers regarded him as half divine and placed unquestioning faith in his teaching.

PYTHIAN GAMES (pith'i-an), one of the four great national festivals of Greece, celebrated every fifth year in honor of Apollo, at Delphi. It is said that they were instituted by Apollo after he had overcome the dragon Python, and unt'l 586 B. c. they took place every eighth year, but at that time they came under the direction of the Amphictyons, who instituted their celebration every fifth year. They consisted of athletic sports, flute playing, and chariot and horse racing. Later contests in sculpture, painting, tragedy, and historical recitations were added. Prizes of gold and silver were awarded in the early history of the games, but afterward the laurel wreath and the palm branch were substituted. These games were in importance next to the Olympic games and continued to be played until about 394 A. p.

PYTHIAS (pith'i-as). See Damon.

PYTHON (pī'thŏn), a genus of snakes native to the tropical regions of Africa and Asia, closely allied to the boa. They differ from the boa mainly in having double plates under the tail, teeth in the intermaxillary bone, and pits in the shields around the margins of the upper and lower jaws. Pythons attain a length of from fifteen to thirty feet and crush their prey in their coils. The tail is prehensile, with which they suspend themselves from the branches of trees near places where animals come to drink, and take them unawares by casting their coils about the neck and body. They are capable of strangling deer, tigers, buffaloes, and other animals. The two most important species are the rock snake of the East Indies and the Natal rock snake of Africa. Allied but smaller species are found in Australia and the Malay peninsula. The female python lays its eggs in a nest near a body or stream of water and hatches them by the heat of the body.

PYTHON, in mythology, a great serpent that came from the slime of Deucalion's Flood. It lived in the cave of Mount Parnassus, which no one approached without being killed. Apollo finally killed it with his golden darts. It is supposed that the python represented the unhealthful pools and marshes, while Apollo, the sun, dried up these swamps with his rays. The slayer of the python is represented by the statue of Apollo Belvedere.

PYX (piks), the vessel used in the Roman Catholic Church to contain the consecrated water that remains after service. It is shaped like a cup and is closed with a cover of the same material. The interior is either of pure gold or is plated with gold. Formerly the pyx was made in the form of a dove and hung suspended over the altar.

The name pyx is applied to a strong box used in the mint to deposit specimens of the coinage. The coins kept in the pyx are examined by a commission of experts for the purpose of testing their accuracy as to weight and fineness. In Great Britain at least one examination is made every year by a jury of goldsmiths, and this examination is called the trial of the pyx. A similar examination is made in February at the mint in Philadelphia. It takes place before the judge of the district court of the United States for the eastern district of Pennsylvania, the assayer of the New York assay office, the comptroller of the currency, and other persons appointed by the President.

PYXIE (piks i), a small shrub native to North America, found in the region from Maine to North Carolina. It is a creeping or trailing plant and thrives best in a moist and sandy soil. The flowers are pink and white and appear early in spring. The plants grow wild, but they yield choicer flowers under cultivation.



Q

QUADRUPLE ALLIANCE

Q, the thirteenth consonant and seventeenth letter of the English alphabet. It has only one sound, that of k or hard c, and is always followed by u. It is used mostly as an initial letter of a word and never as the final letter. Since its office could be filled by kw or k, it is superfluous in English. The Anglo-Saxons did not use it, its sound being expressed by ew or cu, but later adopted it from the Latin-French. It is so named from the French word queue, meaning taul, its form being an O with a tail attached.

OUACKENBOS (kwak'en-bos), George Payn, educator, born in New York City, Sept. 4, 1826; died in New London, N. H., July 24, 1881. He graduated from Columbia College in 1843, entered upon the study of law, but soon after became principal of a collegiate school in New York City. From 1848 to 1850 he was editor of the Literary Magazine and edited several treatises and dictionaries of foreign languages. Though a successful educator, he is best known by a large number of school text-books written by him and published under his direction. Among them are "Advanced Course of Rhetoric and Composition," "Natural Philosophy," "School History of the United States," "Language Lessons," and several series of textbooks of arithmetic and English grammar.

QUADRANT (kwŏd'rant), in astronomy, an instrument for measuring altitudes, so named because of its being graduated on a scale of 90°, the quarter of a circle. It consists of a graduated arc of 90°, with a movable radius for measuring angles on it, and has been largely superseded by the mural circle and the meridian circle. However, it is still used to some extent on shipboard to measure the altitude of the sun, but there it is giving place to the sextant, an instrument quite similar in principle and application. The quadrant is giving way to the other instruments named because it is less adapted than they are to secure reasonable exactness of the whole arc.

QUADRIGA (kwod-ri'ga), the name of a Roman car or chariot drawn by four horses abreast. It came into use during the Olympian games of Greece, but was later adopted by the Romans for races and performances in the circus.

QUADRILATERAL (kwod-ri-lat'er-al), in military science, a combination of four fortresses, so situated that each may effectually support the others in case of an attack. Fortresses located in this manner make it necessary that an enemy employ a large army to attack successfully the combined position. The most remarkable quadrilateral is situated in the northern part of Italy and includes the four fortresses of Legnago, Mantua, Peschiera, and Verona. These form a powerful barrier in the northern plain of the Po River. They were important in the wars between Austria and Italy and when that section was invaded by Napoleon III. in 1859. The Polish quadrilateral is a similar combination of four defensive forts maintained by Russia in Poland.

QUADRILLE (kwå-drĭl'), in French, square, the name of a dance of French origin, so called because the dancers are arranged into squares, each consisting of four couples. It originated in the 18th century and is in extensive use in Europe and America. The movements are consecutive, generally five in number, and are directed by a caller and accompanied by music.

QUADRUMANA (kwŏd-ruma-na), the name of a division of mammals which include the apes, monkeys, and lemurs, so called from their having a grasping hand on each of the four extremities. In this respect they are distinguished from the Bimana, or the human races, in which only the fore limbs have hands. However, they are usually classed with the true quadrupeds. They are almost exclusively confined to the tropical regions and feed principally on vegetable food in a state of nature. While the chimpanzee and gorilla approach the human types of organization, the lemurs and others seem to form an immediate place between the bats and the carnivora.

QUADRUPLE ALLIANCE (kwod'ru-p'l), the name applied to several alliances formed by various European states with a view of counteracting political tendencies or promoting compliance with recognized treaties. The triple alliance contracted by Austria, France, and England, in 1718, was converted into a quadruple alliance the following year by Holland joining the contracting parties. It was occasioned by

Spain seizing Sardinia, in 1717, and Sicily, in 1718, contrary to the terms of the Peace of Utrecht, and because Alberoni, the ambitious minister of the Spanish king, planned to acquire the throne of France for Spain and to influence the accession of the house of Hanover in England. Spain was compelled to abandon all these designs after a prolonged conflict of arms. The quadruple alliance formed by Prussia, Austria, Russia, and England, in 1814, was occasioned by the ambition of Napoleon I., and was one of the causes of the dissolution of the French Empire.

QUAESTOR (kwes'tor), the title of certain magistrates of ancient Rome, whose offices were established in the early period of the Roman kingdom. The duties pertaining to the office included management of the public treasury, the receipt of tribute and taxes, and the payment of moneys on account of public service. Patricians were at first the only persons eligible to the office, but in 421 B. c. the number was increased from two to four, and the plebeians became eligible to service. With the annexa-tion of acquired territory the duties of the quaestors were multiplied, and the number was increased accordingly. At the beginning of the First Punic War eight quaestors were provided for, and these were increased to twenty by Sulla and to forty by Julius Caesar.

QUAGGA (kwag'ga), an animal of the horse genus, native to South Africa, but now extinct or assimilated with the zebra. This class of

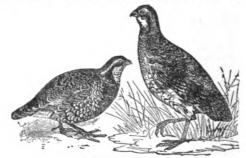


QUAGGA.

animals differed from the zebra in being stronger and heavier and in having no stripes on the limbs, though the head and neck closely resembled those of the zebra. The color was a dark reddish-brown on the upper parts, with white bands on the head and neck, and a black line running along the spine. They had no warts on the hind legs, the mane was short and upright, and at the shoulders they were about four feet high. The lower parts of the body were white, but there were bars of a brown or black tinge at the upper parts of the legs. They were so named from the voice, which somewhat resembled the bark of a dog. They did not

generally associate with the zebra, but, since they were gregarious in habits, the remaining numbers joined the herds of zebras. Formerly many quaggas roamed on the plains of South Africa. They became extinct on account of their skins being valuable in the manufacture of boots and shoes, for which they were hunted by the Boers and other European settlers.

QUAIL, a class of birds of the partridge family, differing from other partridges mainly in being smaller and having longer wings and



COMMON QUAIL.

a shorter tail. They are capable of enduring flight more successfully than the grouse. The average length of the body is about seven inches, but they differ greatly in size, ranging from the large species of Europe to the small quails, about four inches in length, found in Twelve American species have been described, the best known being the common quail, which is sometimes called bobwhite. The latter name is applied because of its call note. It is mainly reddish-brown in color, with mottled markings of a darker hue, and is about ten inches long. Its claws are acute and slightly curved. Another American species, the California quail, is found mostly in Mexico and the southwestern part of the United States. It is known for its crest of a few feathers. The common quail of Europe is migratory, but those of North America do not migrate. Quails feed on grain, seeds, and insects. The young brood is guarded carefully by the mother, though in habit quails are somewhat quarrelsome among themselves. The female builds a nest in the ground, where from eight to fifteen eggs are laid. They never perch in trees, but rest on the ground at night and seek shelter in the winter by gathering in packs under shrubs, grasses, and vines. The flesh is considered a great delicacy on account of its fine flavor and tender qualities. From its note, the quail is commonly called Bobwhite.

QUAKERS (kwāk'ērz), or Society of Friends, a Protestant sect founded in England by George Fox in 1648. The founder was a man of zealous devotion and pure life, and, after preaching for some years in churches and public places, gathered about him a large number of preachers, who assisted in promulgating

his doctrines. Many persecutions were perpetrated upon him and his devoted followers, and some were even transported to penal colonies by the authorities, but through persevering efforts the doctrines secured a strong foothold in Great Britain and America. At first no particular organization and discipline were adhered to, but such scholarly and learned men as William Penn and Robert Barclay not only stimulated organization, but took an important part in their colonization in the New World, especially in Pennsylvania and New Jersey. The Quakers have not been particularly numerous, either in Europe or America, but their purity of life and firm and uncompromising position on various important questions have given them a wholesome influence in public affairs.

Among the doctrinal tenets of the Quakers is the view that the spirit of God is revealed immediately to each soul, a doctrine founded chiefly on passages in the first chapter of the gospel of Saint John, where the Word is spoken of as the life and light of man, and as "the true Light, which lighteth every man that cometh into the world." Thus, it is held that this light comes both to the heathen and the Christian, and manifests the love and grace of God toward all mankind. They deny the necessity of the practice of the sacraments of baptism and the Lord's supper; maintain no stated ministry, holding that the form of worship in which a person waits in silence and patience upon God is best; and practice remarkable simplicity in their dress, speech, household furniture, marriages, and funerals. Much stress is laid upon earnestness and honesty, holding their members duty bound to pay their debts in full, even after having been released from legal payment by bankruptcy or the statutes of limitation. In the main they agree with other sects in the doctrines of Christianity, holding the Scripture as proceeding from the spirit of God and believing in the Father, Son, and Holy Spirit. They accept the atonement of Christ and believe in sanctification by the spirit. The Quakers have been consistent in supporting every form of temperance and in opposing slavery and war.

At present there are four principal divisions of Quakers, known as Orthodox, Hicksite, Wilburite, and Primitive Friends. The Orthodox Friends represent the original organization and are the most numerous. At present they have 840 churches, 1,290 ministers, and 95,000 church members, distributed more or less over the United States, but numerically strongest in Indiana, Iowa, Kansas, and Ohio. The Hicksite Friends comprise a division organized in 1827 by Elias Hicks, who held that all the Scriptures are not inspired and denied the spiritual conception and divinity of Christ. Fully one-half of the American Quakers followed his leadership and at present the division includes 115 ministers, 210 churches, and a membership of 22,850. The Wilburite Friends are followers of John Wilbur of Rhode Island, who, in 1843, dissented from the Orthodox Friends on the ground that their position inclined too much toward the evangelical. They maintain 53 churches and 40 ministers and have 4,500 members. The Primitive Friends claim to adhere most closely to the primitive customs of the society. They have 10 churches and 12 ministers and their membership is about 250.

The most recent reports show that the Quakers of the United States maintain eight institutions of learning, with 95 professors, 850 students, and endowment funds amounting to \$1,500,000. Their principal educational institutions are Haverford College, near Philadelphia; Swarthmore College, near Philadelphia; Bryn Mawr College; and smaller institutions at Wilmington, Ohio, Richmond, Ind., Oskaloosa, Iowa, and Newberg, Ore. They have effective missions in China, Japan, India, Syria, Madagascar, and the West Indies. Their periodicals include the Christian Worker, Friends' Intelligencer, and Friends' Review. Quakers are disposed to be in favor of peace and good will, maintain a simple body government, and have four classes of meetings, known respectively as preparative, monthly, quarterly, and yearly. In these all matters of discipline and government are discussed. The ministry depends largely upon individuals being moved by the spirit.

QUAMASH (kwom'ash), or Biscuit Root, a plant of the lily family, closely allied to the hyacinth. It bears purple flowers, has an erect stem, and yields a bulb of considerable size. These bulbs are a nutritious food with an agreeable taste and are eaten after being roasted by the Indians. Several species of quamash are found in the western part of North Amer-

ica, especially on the prairies.

QUAPAW (qwa'pa), a tribe of North American Indians, belonging to the Sioux family. They speak a dialect of the language spoken by the Kaw, Omaha, and Osage tribes. Formerly they occupied a large region along the lower Mississippi, from the mouth of the Ohio to the Gulf of Mexico. In an early date of the Louisiana Colony they were allies of the French. At present they number a few hundred and are on reservations in Oklahoma, but they are mixed largely with other tribes.

QUARANTINE (qwor'an-ten), an enforced isolation of any place or person infected with a contagious disease. The term originally implied isolation for a period of forty days. Quarantine regulations were first established in Venice about 1448. For many years it was customary in the leading ports of the world to inspect vessels coming from foreign or adjacent ports and to make an examination of their sanitary conditions. Ships found infected with epidemic diseases were required to forbear all intercourse with the port at which it arrived for forty days, but now the length of time varies according to the circumstances of the

case, and is dependent upon the time in which all danger of infection passes away. A yellow flag is displayed from the head mast of a vessel under quarantine, while at night a white light is displayed similarly. National quarantine stations were established by the United States in 1888, and an act of Congress makes violations of their regulations punishable by fine or imprisonment, or both. Protection against contagious diseases in cities, towns, and minor divisions is vested under the general laws of the states or provinces in the local boards of health, which have power to establish quarantines in their respective districts.

QUART, a measure of capacity, both dry and liquid, in the English system of weights and measures. In dry measure it contains 67.2 cubic inches, is divided into two pints, and is the eighth part of a peck. The quart in liquid measure contains 57.75 cubic inches, is divided into two pints, and is the fourth of a gallon.

QUARTERMASTER (kwar'ter-mas-ter), in military usage, an officer of a regiment or other body of troops, usually ranking as first lieutenant, in whom is vested the duty of assigning quarters, arranging camps, providing and issuing clothing and provisions, and furnishing storage and transportation. The quartermaster in the navy is a petty officer who assists the navigator and attends to the steering of the vessel, the compasses, signals, signal apparatus, lights, and other matters under the direction of a master.

QUARTET (kwar-těť), a musical composition for four voices or four instruments, written on the obligato plan; that is, each part is necessary to maintain the effect of the whole composition. The ordinary instrumental quartet is arranged for the first and second violin, a viola, and a violoncello. Three recognized quartets of singers are in general use, which are called respectively the mixed, male, and female quartets. The mixed quartet consists of the soprano, alto, tenor, and bass; the male quartet is made up of the first and second tenor and first and second bass; and the female quartet comprises the first and second soprano and the first and second alto. Haydn originated the quartet. Many compositions classed as quartets were later written by Mozart and Beethoven. Other great masters adding to this line of music are Schubert, Mendelssohn, Schumann, Spohr, and Brahms.

QUARTZ, a native oxide of silicon, which occurs either in a massive or crystalline state and varies greatly in luster, transparency, and color. It is diffused abundantly throughout nature in both states. In the massive state it is not pure silex, containing various foreign substances, but in the crystalline state it is pure, and is formed of six-sided prisms, terminated by a pyramid at each end. Among the most abundant colors are gray, white or milk, purple, reddish, green, blue, and brownish. It abounds

in rocks and is an essential element of granite. Quartz is infusible in the blowpipe flame and resists all acids except hydrofluoric. It is positively electrified by friction and scratches glass readily, and two pieces may be rendered luminous by rubbing them together in the dark.

Particular names are applied to the principal varieties of quartz, such as common quartz, rose quartz, smoky quartz, milky quartz, rock crystal, yellow quartz, blue quartz, fat quartz, amethyst, hornstone, flint, floatstone, carnelian, Lydian stone, radiating quartz, chalcedony, sapphire quartz, and agate. Quartz enters largely into the manufactures and arts, being employed for making cups, chandeliers, optical instruments, several kinds of glass, and seals. It is important in the manufacture of pottery and porcelain of different kinds, for which purpose it is made into a powder. Quartz veins occur in metamorphic rock, and contain more metals than the masses of rocks through which they are distributed. Gold is found principally in quartz veins or in alluvial sands and gravel, but the quantities taken from alluvial deposits are mere fragments carried by weather and climatic conditions from their natural deposits in quartz veins.

QUARTZITE (kwartz'īt), a mineral composed principally of quartz, forming a metamorphic rock. It originated from the alteration of sandstone, the grains of which were enlarged by the addition of silica while in a partial state of solution. This gives the appearance of a solidified and uniform rock, but the original rounded surface of the sand grains is revealed by the microscope. In many specimens are traces of iron, mica, and felspar.

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QUASSIA (kwŏsh'i-a), the name of a small tree native to the West Indies and tropical America, so named from Quassi a Negro who



QUASSIA: FLOWER AND PLANT.

recommended the bitter bark as a remedy for fever. The bark of the quassia was introduced as a medicine into Europe about the middle of the 18th century, and is now used extensively as a tonic in cases of gastric debility and as a substitute for hops in making beer. When taken in excessive doses, it produces narcotic and irritant effects and sometimes causes vomiting. The wood is useful in cabinetmaking, since it is free from attacks by insects. The quassia bark and products sold in the market are obtained

chiefly from Venezuela, Panama, northern Brazil. and Guiana.

QUATERNARY PERIOD (kwa-ter'na-ry), the division of time which embraces the post-tertiary strata. It is frequently referred to as the Age of Man, since it is coextensive with the period of the existence of mankind. In the classification of some writers the terms Quaternary and Pleistocene are used synonymously, while others divide the Quaternary into the two periods of Pleistocene and Recent. See Geology.

QUAY (kwā), Matthew Stanley, statesman, born in Dillsburg, Pa., Sept. 30, 1833; died May 28, 1904. He graduated from Jefferson College in 1850, became a member of the bar in 1854, and entered the United States army at the beginning of the Civil War, attaining the rank of colonel. From 1865 until 1867 he served as a member of the Pennsylvania Legislature. He was Secretary of State from 1873 to 1878 and recorder of Philadelphia from 1878 until 1879. He became State treasurer in 1885 and was elected to the United States Senate in 1887, serving in that capacity with considerable distinction for many years. In 1899 he was brought to trial on the charge of having used State funds for personal profit, but the jury rendered a verdict of not guilty. However, the members of the Legislature were unable to agree upon reëlecting him to the United States Senate and adjourned without making a choice, but Governor Stone immediately appointed him to that position. In 1901 he was again elected Senator by the Legislature. Quay was long an influential factor in the Republican party and attended many of its national conven-

tions in an official capacity.

QUAYLE (kwāl), William Alfred, pastor and educator, born in Parkville, Mo., June 25, 1860. His parents came to the United States from the Isle of Man. In 1885 he graduated at Baker University, Baldwin, Kan., where he was professor of literature and Greek from 1887 to 1890. In the latter year he was made president of that institution and, after serving efficiently for two years, he resigned to accept a pastorate in the Saint Louis conference of the Methodist Episcopal Church, and as pastor held important charges at Kansas City, Indianapolis and Chicago, being elected bishop while holding the last mentioned charge. His literary work includes "A Hero and Some Other Folks," "In God's Out of Doors," and "The Blessed Life."

QUEBEC (kwe-bek') the capital of the Province of Quebec, in Quebec County, at the junction of the Saint Charles and Saint Lawrence rivers. It is situated about 300 miles from the Gulf of Saint Lawrence, 175 miles northeast of Montreal, and is the focus of numerous railroads, including the Canadian Pacific, the Grand Trunk, the International, and other lines. The city occupies a promon-

tory on the northeastern bank of the Saint Lawrence, known as Cape Diamond, and extends partly into the lower valley of the Saint Lawrence. The highest point is 342 feet above the river and near it are a citadel and many fine residences. Access to this portion of the city is by an elevator, several flights of steps, and a steep but beautiful street. Trade and commerce are centered in the lower part of the site, and near the business section are the manufacturing districts of Saint Roch and Saint Sauveur.

DESCRIPTION. The architecture of Quebec is substantial and of good material, though many of the streets resemble those of Europe rather



QUEBEC AND VICINITY.

than the usual American thoroughfares. The public gardens and walks are in the upper part of the city, which contains the principal residences and churches. Dufferin Terrace, a promenade 1,400 feet long, is about 200 feet above the river and affords a fine view. The Governor's garden, located back of the promenade, overlooks the Saint Lawrence River and contains a monument erected to the memory of Wolfe and Montcalm. The suburb of Saint John is located west of the city, and near it are the Plains of Abraham. The last mentioned locality is famous as a battle ground in 1759, when General Wolfe lost his life at the point of victory. This event is commemorated in a column forty feet high. Other localities of interest include Montmorency Falls, where a battle between Montcalm and Wolfe took place; the Chaudière Falls; the three forts of Levis; Saint Anne de Beaupre, which contains a noted church; and Beauport and its asylum.

PUBLIC UTILITIES. Communication is furnished by an extensive system of electric railways, which has lines to many suburban and interurban localities. The pavements are constructed largely of a fine grade of gray limestone, which is quarried in the vicinity, and

many of the streets are macadamized. Power to propel the electric lighting plant and other establishments is obtained from Montmorency Falls, about six miles distant. Lake Saint Charles supplies the city with water through an extensive system. Other public utilities include gas lighting, sewerage, drainage, and a public library with a fine collection of books and

pamphlets.

BUILDINGS. Quebec is the seat of Laval University, founded in 1663, and has many other educational and scientific institutions. of note include Morrin College (Presbyterian), which is connected with McGill University at Montreal, the Laval Normal School, the Ursuline Convent, which has a tract of beautiful grounds, and the Marine Hospital. It has many academies, high schools, and public and private schools. The leading churches include the First Methodist Church, the Anglican Cathedral, the Roman Catholic Basilica, the Saint Andrews' Presbyterian Church, and a number of others. The basilica mentioned above has a seating capacity for 4,000 people and contains paintings from many artists, including Ceracci and Van Dyck. The most prominent public secular buildings include the houses of Parliament, the county courthouse, the city hall, the Masonic Hall, the armory, and the customhouse. Many of the office and business blocks are of modern construction.

INDUSTRIES. Quebec is the seat of a large domestic and foreign trade. It has a safe harbor with wharves on both rivers for the accommodation of the largest vessels. At the mouth of the Saint Charles is the spacious Louis Basin, which is inclosed by the Louis Embankment, forming a fine promenade on the river front. Lumber, grain, hides, and merchandise are shipped in large quantities. The manufactures include boots and shoes, leather, cutlery, hardware, clothing, rubber goods, and steel and iron products. Shipbuilding is an important enterprise. Levis, across the Saint Lawrence, is connected with Quebec with a fine cantilever bridge.

HISTORY. The site of Quebec was occupied by an Indian town called Stadacona in 1535, when the Saint Lawrence was explored by Jacques Cartier. Champlain founded the city in 1608, while exploring that region for France, and it was named Quebec by its founder. Sir David Kirke captured the settlement in 1629 for the English, but it was restored to the French in 1632. The colony was made a royal government in 1663, when Quebec became the capital. In 1759 General Wolfe gained his famous victory on the Plains of Abraham, and since that time the city has been a part of the British Empire. The Americans made an unsuccessful attempt to capture it in 1775, when General Montgomery was slain. It was the capital of Canada a number of years, but the capital was removed to Ottawa in 1858. About five-sixths of the inhabitants are of French

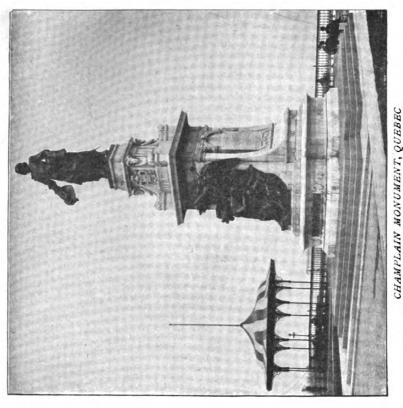
descent, hence the French language is spoken very extensively. Population, 1911, 78,290.

QUEBEC, a province of the Dominion of Canada, formerly known as Lower Canada. It is bounded on the north by Hudson Strait, northeast by the coast of Labrador, southeast by the Gulf of Saint Lawrence, New Brunswick, and Maine, south by New Hampshire, Vermont, New York, and Ontario, and west by Ontario and Hudson Bay. The length from north to south is about 2,500 miles and the extent from east to west is 998 miles. It is separated from Baffinland by Hudson Strait and from Newfoundland by the Strait of Belle Island. The area, including a number of coast islands, is 706,262 square miles, of which about 5,800 square miles are water surface. This area includes the addition of 1912, when all of Ungava was annexed, giving it the form of a vast peninsula.

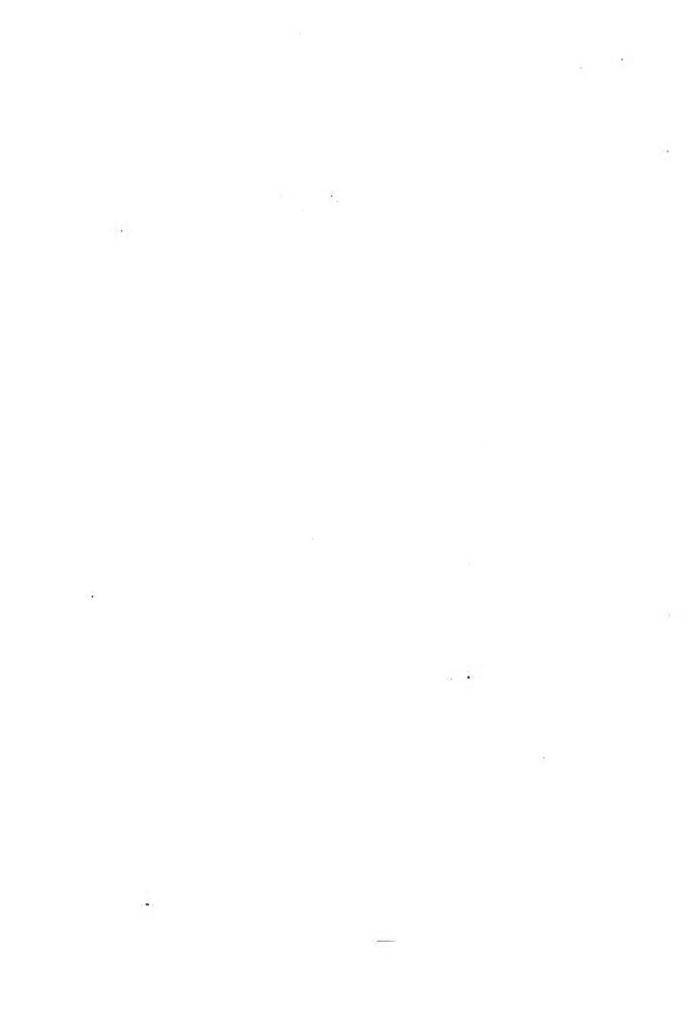
DESCRIPTION. The surface is greatly diversified and in many localities the natural aspects are wild and grand. The Acadian region of Quebec lies south of the Saint Lawrence River, which includes a part of the Appalachian Mountains, known here as the Notre Dame and the Shickshock mountains. They extend along the south side of the Saint Lawrence, from the vicinity of Quebec to the Gulf of Saint Lawrence and comprise the predominating system. Their general elevation is about 1,500 feet, but they rise in places to heights ranging between 3,000 and 4,000 feet. This mountainous section is in part a wilderness that is exposed to summer frosts. A region of lowlands extends along the north side of the Saint Lawrence, from Quebec to the city of Ottawa, Ontario, and embraces an area of about 10,000 square miles. It is a plain from 300 to 400 feet above the sea and comprises a fertile area dotted with The northern part of Quebec is included in the Laurentian Mountains, or Laurentides, which stretch from Labrador to Ontario, forming the principal divide between the rivers that flow into the Saint Lawrence and its tributaries and those that enter James Bay and Ungava Bay. This section has an altitude of from 800 to 1,700 feet and much of it is either hilly or broken.

The Saint Lawrence is the most important stream. It enters the Province from the southwest and passes entirely through it in a direction toward the northeast, entering the Gulf of Saint Lawrence by an extensive estuary. Within the Province of Quebec it receives the Ottawa, the Saint Maurice, the Saguenay, the Bastard, the Chaudière, the Saint Francis, and the Richelieu. A large section in the northwestern part is drained into James Bay by the Ruperts, East Main, Nottaway, and Harricanaw rivers. The Northwest River drains the eastern part into the Strait of Belle Island. The beautiful sheets of water include Lake Mistassinni, Saint John, and Peretibbe. At the mouth of the Saint Lawrence is the island of Anticosti, which

THE WOLFE AND MONTCALM MONUMENT, QUEBEC One of the oldest of the monuments in Quebec is the plain shaft erected in 1837 to the memory of Wolfe and Montcalm, who battled so bravely in the long ago and by a single struggle added their names to the world's roll of liustrious military heroes. The monument stands in the Governor's Garden, not far from the Dufferin Terrace.



At the north end of the Dufferin Terrace rises the splendid statue of Champlain, the Founder of Canada, unveiled as recently as 1898. No hero of American discovery is more deserving of such honor than the resourceful captain who planted French civilization on the banks of the St. Lawrence and opened new pathways across the wilderness beyond.



is 140 miles long and 30 miles wide. Fine forests of hemlock, pine, cedar, oak, elm, spruce, birch, beech, and other woods are abundant.

The climate is healthful, but the winters are long and cold, when the thermometer often falls to 20° below zero. In summer it is warm but not excessive, and the temperature quite frequently approaches 90°. The mean annual temperature is 45° at Montreal and 29° in the northern part. Sufficient rain falls for the germination and maturity of all crops. Heavy snows occur in the winter, when sleighing continues fully five months. The spring is mild and pleasant and the autumn is long and healthful.

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Mining. Quebec is particularly rich in minerals, only partially developed. In the output of asbestos it has first rank and yields nearly the entire supply marketed in the world. Iron is mined extensively in the region south of the St. Lawrence, especially east of the Richelieu River, and in many places of the north central part. Deposits of

230 MILES

QUEBEC.

1. Quebec; 2. Montreal; 3. Hull; 4, Sherbroke. Chief railways shown by dotted lines.

gold and platinum occur in the same fields, but the output is not large. In the basin of the Ottawa are deposits of mica, plumbago, phosphate, and lead. Although coal does not exist, the Province has an inexhaustible supply of peat, but the product is not used outside of small localities. Many building stones are abundant, such as granite, marble, and limestone. Clays suitable for pottery and brick are widely distributed.

AGRICULTURE. A large majority of the people are engaged in agricultural pursuits. The portion lying along the Ottawa and Saint Lawrence rivers are the most fertile, but large tracts suitable for farming and grazing are abundant in the river valleys. Wheat, oats, barley, rye, hay, and buckwheat are the leading crops. Extensive interests are vested in growing tobacco and vegetables, especially potatoes, turnips, celery, carrots, and sugar beets. Apples and grapes of a fine flavor are grown in the southern part, and small fruit is raised successfully in all sections where settlements have been established. Cattle are reared profitably for meat and dairy purposes. Other domestic animals include

horses, sheep, swine, and poultry. Formerly the Province was looked upon as poorly suited for agriculture, but experience has demonstrated that it possesses unexcelled resources for diversified farming.

The industrial enterprises MANUFACTURES. are numerous and diversified, owing chiefly to extensive natural resources. Large quantities of fine timber are available, including, oak, beech, white pine, spruce, cedar, walnut, and hickory. Lumber is sawed both for exports and for material in manufacturing enterprises, such as making doors, furniture, and farming machinery. The fisheries yield a large output of lobster, cod, salmon, and herring, and these are cured and canned in large quantities. The manufacture of furs is important, a large supply of the material being obtained from the fur-bearing animals native to the Province, such as the mink, beaver, bear, caribou, and muskrat. Boots and shoes, tobacco products, cotton and woolen goods, chemicals, leather, paper, and steam and agricultural machinery are made in

large quantities. Butter and cheese factories are operated in nearly every parish and the product is unrivaled in quality.

Transportation and Commerce. Large ocean steamers ascend the Saint Lawrence as far as Montreal, and smaller streams, such as the Ottawa and the Saguenay, furnish river transportation into the interior. James Bay and the Atlantic are navigated a part of the year. Railway building received early attention under aid by the Province and the lines now have a total of 4,125 miles. The principal railways include the Canadian Pacific, the International, the Grand Trunk, and the Quebec and Saint John rail-

roads. Electric railways are operated in the cities and many rural districts. Telephone and telegraph lines are used extensively in all sections. Navigation is facilitated by 125 light stations, 160 lighthouses, and numerous lightships.

Quebec has commercial advantages over every other Province of Canada, since its seacoast may be said to extend from its eastern extremity to Montreal. The natural advantages in commerce have been extended by the construction of numerous canals to overcome obstructions in the smaller rivers, such as the Grenville Canal, which overcomes the rapids in the Ottawa River, the improvement at Saint Ours to render the Richelieu navigable from the Saint Lawrence to Lake Champlain, and the canal that connects this 1 ke with the Hudson River in the United States. The Lachine Canal, about eight miles long, carries vessels around the Lachine Rapids and overcomes the rise between Montreal and Lake Saint Louis. The rise between Lake Saint Louis and Lake Saint Francis is avoided by the Soulanges Canal, which avoids the Cedar, Cascades and Cauteau rapids. These canals, that is, the Lachine and the Soulanges,

contribute to admit navigation from Montreal to the Great Lakes. The trade outside of Canada is largely with Great Britain and the United States. Among the exports are lumber, live stock, fish, asbestos, and dairy products. The imports include coal, raw cotton, and manufactured goods.

GOVERNMENT. Executive authority is vested in the Lieutenant Governor, who is appointed by the Governor General of Canada and is assisted by an executive council of seven members. Both the Governor General and the council are responsible to the General Assembly. Legislative authority is intrusted to the Legislature of two chambers, the legislative council of 24 members and the legislative assembly of 74 members. The former are appointed for life, while the latter are elected every five years by popular suffrage. Both the system of courts and the local government are administered under the French plan of administration, which is a privilege guaranteed at the time Quebec was made a part of the British Empire. At the time of the Confederation it was agreed that Quebec is to be represented in the Dominion House of Commons by not less than 65 members, which is the number at present, and it is represented in the Senate of the Dominion by 24 members.

EDUCATION. Although a general system of public education is maintained, it differs from those of the other provinces in the Dominion in that the schools for Protestants and Catholics are separate from each other. A superintendent of public instruction is at the head of the schools, but the administration is represented by two committees, one each for the Protestant and Catholic inhabitants. Both receive support from the public funds, but the religious instruction differs according to the respective courses of study prescribed. Local boards have general charge of the individual schools. In 1908 the Province had 985 Protestant and 4,995 Catholic schools. Attendance upon the schools is free and compulsory for a prescribed period. Special attention is given to the study of agriculture.

Laval University, located at Quebec, is a Catholic institution, but a Protestant branch is maintained at Montreal. Other institutions of higher learning include the Bishop's University, Lennoxville; the McGill University, Montreal; the Laval Normal School, Quebec; the Polytechnic School, Montreal; the Wesleyan Theological College, Montreal; the Congregational College of Canada, Montreal; the Stanstead Wesleyan College, Stanstead; the Presbyterian College, Montreal; and the Montreal Diocesan Theological College, Montreal. Ample provisions have been made by the Province for the care of the incorrigible and unfortunate. Many charities are maintained for the care of the aged, infirm, and dependent.

INHABITANTS. Quebec was originally settled by the French and the inhabitants consist largely of French-Canadians. In language, manners, and temperament this class is French. Much of the architecture as well as the habits of dress and the tendencies in social life are French rather than American. The greater number of inhabitants are Roman Catholics, only about one-fifth being Protestants. The Episcopalians, Presbyterians, and Methodists are the strongest Protestant denominations. Although the increase in population has been comparatively small, it is greater than in any of the eastern provinces. About 10,700 Indians reside in Quebec. In 1911 the total population was 2,002,712. Ouebec, on the Saint Lawrence, is the capital. Other cities include Montreal, Saint Henri, Hull, Sherbrooke, Levis, Montmagny, Three Rivers. and Saint Hyacinthe.

HISTORY. Jacques Cartier explored the Gulf of Saint Lawrence in 1534, when he claimed the Gaspé Peninsula as a dependency of France. Captain Champlain laid the foundations of Quebec in 1608, when he constructed a fortress on the promontory called Cape Diamond. It was little more than a trading post until 1617, when Louis Hébert and others began to develop farming. For many years the Indians were hostile to the advances of the whites and a force of English captured Quebec in 1629, but it was soon restored to its former owners. The royal governor was appointed by the King of France in 1663, exactly 100 years before the region

was ceded to the British, in 1763.

An American army besieged Quebec in the American Revolution, but the people remained unfriendly to the invaders. Upper Canada was made a separate Province in 1791, when French-Canada, or Quebec, was organized as Lower Canada, which continued until 1841, when the union with Upper Canada went into effect. In 1867 the Confederation was organized, when both Quebec and Ontario became provinces in the Dominion of Canada. Since that time the Province has had an almost unbroken period of growth and progress. In 1912 the district of Ungava was annexed to Quebec, making it the largest Province in the Dominion.

QUEBEC, Battle of, an important battle near the city of Quebec, on the Plains of Abraham. The French under Montcalm, numbering 16,000, held the heights on the north bank of the river and fortified themselves in June, 1759. When General Wolfe seized the heights on the south, the French decided to adopt the defensive plan. The British extended the line of defense by moving their ships past the city, and later landed their forces and entrenched themselves on the French left. The assault at Montmorency and several other points proved futile, but the British gained a decisive advantage on Sept. 13 on the Heights of Abraham, where both Wolfe and Montcalm were killed. This defeat of the French not only caused them to lose Quebec, but their entire possessions in the northern part of America.

Another attack was made upon Quebec at the

beginning of the Revolution, which was a part of the scheme of the conquest of Canada. Benedict Arnold was sent against Quebec with an army by the way of Maine, while General Montgomery proceeded with another force by way of Lake Champlain and the Saint John's River. Arnold reached Quebec on Nov. 13 and Montgomery came on Dec. 3, 1775. The combined forces numbered 1,200 men. They made a systematic attack upon the town from opposite sides on Dec. 31, 1775, but were repulsed with considerable loss. Arnold was severely wounded and Montgomery was slain, while General Morgan and a company of Virginia marksmen were taken prisoners. The expedition proved an entire failure.

QUEBEC ACT, an act of the British Parliament, in 1774, which was passed to prevent the Province of Quebec from joining the American colonies in the Revolutionary War. This act extended the boundaries of Quebec so as to include all the Northwest Territory, guaranteed to protect Roman Catholicism as the dominant religion, and permitted the institution of the French civil law. Since the thirteen colonies were almost entirely Protestant, they looked upon this act with indignation.

QUEEN, the wife of a king, or the female sovereign of a kingdom. In some monarchies women are excluded from the throne by the Salic law, but in England the succession devolves upon the eldest daughter or female heir apparent, if a deceased sovereign has left no male heir apparent. A queen consort is the wife of a reigning king; a queen dowager is the widow of a deceased king; and a queen regent, or queen regnant, is a sovereign princess who has succeeded to sovereign power and holds the crown in her own right.

QUEEN CHARLOTTE ISLANDS, an island group in the Pacific Ocean, off the coast of British Columbia, situated north of Vancouver Island. The group includes a large number of islands, but only two are of material importance. These are Graham Island and Moresby Island, which stretch from northwest to southeast a distance of 160 miles. They are separated from each other by a narrow channel called the Skidegate Inlet. The former has an area of 3,000 square miles and the area of the latter is placed at 1,500 square miles. Graham Island has a width of 70 miles at the northern extremity, and thence the land mass gradually narrows toward the southeast. The climate is moist, but healthful, and the islands have a considerable growth of magnificent forests. An abundance of minerals occurs in the islands, including iron, copper, anthracite coal, and goldbearing quartz. By far the largest part of the inhabitants are Indians, who engage in hunting and fishing. The islands belong to the Province of British Columbia.

QUEEN CHARLOTTE SOUND, a channel of the Pacific Ocean, which separates the northern part of Vancouver Island from the mainland. It contains many islands, and numerous coast indentations extend from it toward the north and east. Edible fish, especially salmon, are abundant.

QUEENSBERRY, John Sholto Douglas, public man, born in England, July 20, 1844; died in London, Jan. 31, 1900. He succeeded his father as marquis in 1858 and the following year entered the army, serving until 1864. In 1872 he became a member of the House of Lords, in which he took a more or less active part until 1880. His reputation is based chiefly upon his interests in sports and games. In 1860 he founded the Amateur Athletic Club. He took part in drawing up the Queensberry Rules, in 1867, and these are now the basis for contests in boxing and pugilistic exhibitions.

QUEENSLAND, a State of Australia, located in the northeastern part of that continent. It is bounded on the north by the Gulf of Carpentaria and the Pacific, east by the Pacific, south by New South Wales, and west by South Australia. The length from north to south is 1,260 miles, and its greatest width is 940 miles. It has a seaboard of 1,250 miles, being greatly enlarged by the extension of the Cape York peninsula toward the north. The area is 668,497 square miles.

DESCRIPTION. The Great Dividing Range, which extends along the entire eastern coast of the continent, runs parallel to the coast at a distance of 70 to 100 miles from the sea. From it numerous spurs extend in various directions. The highest peaks range from 3,000 to 5,750 feet above sea level. The coast region is generally fertile and has an abundance of timber, but the interior and western parts are generally dry and treeless. Chains of islands lie off the eastern coast, which is indented by numerous small bays, including Moreton Bay, the harbor of Brisbane. East of the mainland is the Great Barrier Reef, which is formed largely of coral and is from 20 to 150 miles from the coast. The sheet of water inclosed by it is about 1,000 miles long and contains numerous islets.

The drainage of Queensland is chiefly toward the southwest by the head streams of the Murray River, which discharges into the Indian Ocean, and by streams flowing into the salt lakes in the State of South Australia, though the coast region is drained quite generally into the Pacific and the Gulf of Carpentaria. Among the principal rivers are the Warrego, Cooper, and Herbert, flowing toward the southwest; the Brisbane, Burnett, Fitzroy, Pioneer, and Burdekin, flowing into the Pacific; and the Mitchell, Gilbert, Flinders, and Gregory, flowing into the Gulf of Carpentaria. In the western part are extensive treeless plains, but the soil is fertile and produces grasses and shrubs. Here the moisture sinks in the dry ground or collects in lake basins, which evaporate during the dry season.

Queensland is located partly in the Torrid and partly in the South Temperate zones. The interior is not affected by sea breezes, hence has an extremely hot and dry climate. At Brisbane, on the Pacific coast, the temperature ranges from 30° to 60°, with an average of 70°. Here the rainfall is 50 inches, but farther north it ranges from 80 to 150 inches per year. In the western part the temperature is extremely hot and the atmosphere is dry. From five to seven inches of rainfall occur in this section, and all of the State lying west of the Great Dividing Range has an uncertain precipitation.

MINING. Gold is the most important mineral and the output has an annual value of about \$13,500,000. Copper and tin are mined in large quantities and the output of silver is considerable. Other minerals include mercury, lead, tin, antimony, coal, and salt. The output of coal has increased materially the last decade, owing to its larger use in manufacturing enterprises. Salt is abundant in the lakes and lagoons of the west, where it is deposited in large quantities when the water evaporates during the dry season. Metal mining is confined entirely to the mountain region. Granite, marble, sandstone, and limestone are widely distributed. AGRICULTURE. Farming is confined largely along the coast, where the soil is fertile and the rainfall is abundant. Corn is the leading cereal, but it is followed closely by wheat, barley, oats. and rye. Sugar cane is one of the most important crops, and the cultivation of this plant is highly profitable on the rich lands at the mouths of streams flowing into the sea. Many species of tropical fruits, vegetables, and sugar beets are grown profitably. The culture of the silkworm and the mulberry tree has been introduced successfully. While stock is raised profitably on the coast plains, the larger interests in ranching are found in the region of the plains beyond the Great Dividing Range. Queensland exceeds all the other states of Australia in the number of cattle. It has very extensive interests in sheep raising. Other domestic animals include horses, swine, and poultry. However, the investments in cattle and sheep greatly exceed those of other live-stock industries, but the prevalence of drouths sometimes causes the loss of large herds through a lack of water and vegetable growth.

OTHER INDUSTRIES. Queensland maintains a large variety of industries, owing to its varied resources. The forests yield pine, cedar, rosewood, tamarind, myrtle, cypress, red cedar, and bamboos. Gigantic eucalyptus trees abound. It is estimated that about one-half of the surface was originally covered with timber, but the forests on the western slopes are thin or shrubby. Lumbering is a prolific source of income. Pearl fisheries along the coast are important and considerable interests are vested in catching shellfish and deep-sea fish. The manufactures include, sugar, flour, butter and

cheese, spirituous liquors, leather, paper, and lumber products. Woolen and cotton goods are the leading textiles. Large interests are vested in preserving and packing meat, especially beef and mutton.

Transportation. The rivers are not navigable, but many safe harbors are afforded by estuaries and bays. An extensive coastwise trade is facilitated by the long coast line. Railway building is encouraged by the government and the lines in operation have a total of 3,800 miles. They are built largely from points on the coast to mines and trade centers in the interior, and several lines connect with the railway system in New South Wales and South Australia. Electric railways are operated in Brisbane and some interurban points. The exports exceed the imports. They include principally sugar, hides, wool, gold, lumber, and frozen meat. Textiles, clothing, machinery, and hardware are imported.

Government. The executive power is vested in a Governor appointed by the crown, who is assisted by an executive council of nine members, of whom eight hold portfolios. The Parliament consists of a legislative council of 44 members and a legislative assembly of 72 members. All members of the former body are appointed for life by the Governor on the advice of the ministry, while the latter are elected for three years by universal suffrage without regard to sex. The right to vote is based upon a residence of six months and the payment of a nominal tax on property. Local government is administered in the counties and towns, whose officers are elected by the people.

The State extends aid to maintain and extend a system of public education. School attendance is compulsory between the ages of six and twelve years and primary instruction is free and unsectarian. At the time of the last census, in 1901, the returns showed an illiteracy of only two per cent. among the adult white population. A number of charitable, correctional, and educational institutions are maintained at Brisbane and other places.

INHABITANTS. The population consists large ly of Europeans, including principally English, Irish, Scotch, and Germans. The larger membership is in the Anglican Church. Other denominations well represented include the Roman Catholics, Presbyterians, Methodists, and Lutherans. About 20,000 of the inhabitants are Pagans and Mohammedans. Brisbane, on the southeastern coast, is the capital and largest city. It is located near the Darling Downs, hence has a large trade in grain and live stock. Other cities include Maryborough, Rockhampton, Marlborough, Gympie, Charters Towers, Ipswich, and Townsville. Population, 1901, 503,-266. In 1906 the State had a population of 535,113; in 1910, 614,500.

HISTORY. Queensland was first settled in 1825, when a penal station was established near

the present city of Brisbane. It had been explored by Captain Cook as early as 1770, when he made a chart of the coast from Moreton Bay to Torres Strait, but settlements were not attempted until the government sent convicts from England. After that free immigrants began to come in, but the larger part of the inhabitants continued to be constituted of criminals. In 1839 the transportation of convicts was discontinued and the country was opened to settlers in 1842. The settlers who came before that time were known as squatters.

Queensland was organized as a part of New South Wales and continued to be governed in that way until 1859, when it became a separate colony. Gold was discovered in 1867 and shortly after many coolies were imported to work in the mines and on the sugar plantations. This caused an extended conflict between the labor party and the larger employers, with the result that public affairs were largely influenced by organized labor. This was the means of greatly extending government ownership to many of the public utilities, such as the telegraph, telephone, railways, and public service insurance. The colony became an important member in the Australian federation in 1899, when it ratified the constitution of the Commonwealth.

QUEENSTON HEIGHTS, Battle of, an engagement of the War of 1812, which took place at Queenston Heights, in Ontario, near Niagara Falls, on Oct. 13, 1812. The British and Canadian troops under General Brock were encamped on an eminence overlooking the Niagara River, while General Van Rensselaer and 700 Americans were stationed at Lewiston, opposite the village of Queenstown. The latter had been promised reënforcements and was charged with the duty of invading Canada. On the morning of October 13th the Americans crossed the river and made an attack, but their movements were detected by the British, who were compelled to fall back toward the village of Queenstown. Although the Americans at first were successful, the expedition proved a failure, since Van Rensselaer was not supported by the other American commanders, who plead that they were not to leave the soil of their own country. The Americans lost 190 killed and 900 prisoners, while the British lost a total of 130. General Brock was slain in action. A fine monument was erected to his memory upon the battle ground by the Province of Ontario. See Niagara Falls.

QUEENSTOWN, a seaport of Ireland, on the southern coast of Great Island, nine miles southeast of Cork. It is nicely located on an eminence rising from the harbor of Cork, and its streets present a picturesque appearance as they rise above each other. Strong fortifications are maintained on Spike Island and at the entrance of its well-sheltered harbor. The city has a fine Roman Catholic cathedral and several benevolent and educational institutions, and is an important station for emigration. It has no manufactures of importance and but little trade, since the mail business is transacted chiefly at Cork. The delightful climate and beautiful scenery attract many visitors to Queenstown. Formerly its name was Cove of Cork, but in 1849 it was given its present name. Population, 1917, 8,046.

QUELPAERT (kwěl'pärt), or Tamra, an island off the southern coast of Corea, about sixty miles from the mainland. The shores and surface are more or less rocky, but tracts of considerable extent have great fertility. The island is 20 miles long and 20 miles wide, and the area is about 780 square miles. Three extinct volcanoes are on the island, each of which has a lake in its crater. The chief products are rice, fruits, fish, cattle, and silk textiles. Chyei Chyu is the chief town and capital. For the purpose of government it belongs to Corea, and has been under the jurisdiction of Japan since the Russo-Japanese War. Population, 1917, 80,260.

QUERÉTARO (kā-rā'tä-rō), a city of Mexico, capital of a state of the same name, 110 miles northwest of the city of Mexico. It is situated on a plateau 6,370 feet above sea level, has good railroad facilities, and is surrounded by a fertile region. The city has extensive manufactories that produce cotton and woolen goods. These enterprises employ about 4,500 persons. Among the other manufactures are leather, machinery, clothing, tobacco and cigars, earthenware, and utensils. The city is well built and its streets intersect each other at right angles. It derives its water supply from an aqueduct about ten miles long, which is supported a part of the distance upon arches ninety feet high. Among the principal buildings are several fine churches, a number of educational institutions, and the government buildings. Emperor Maximilian was besieged at Querétaro by the republican forces and was shot here on June 19, 1867, by order of a court-martial. Population, 1910, 35,011. QUERN (kwern), a hand mill for grinding

grain, used before the invention of water or windmills. It consisted of two circular stones, the upper of which was pierced in the center with a narrow funnel and the lower was slightly dished. A wooden or metal pin was inserted in the lower stone, on which revolved the upper when turned by means of a stick thrust into a notch in the edge. The grain was dropped with one hand into the central opening as the upper stone was turned with the other. Devices for grinding grain in this manner are of great antiquity, as is evidenced by remains of querns dug up wherever regions were populated by Asiatic or European people. In some sections of Ireland, in the Shetlands, and in the Hebrides querns are still used to a limited extent. Specimens of querns now in the museums of Rome and other European cities give evidence that they were employed very extensively in the Roman period. Those dating from that time contain ornamentations of various Roman devices.

QUESADA (ka-sa'tha), Ximenes de. See

Ximenes de Quesada.

QUETZAL (kěts'ál), or Quesal, the name of a bird native to Central America, belonging to the trogon family. In size it resembles the magpie, but the tail coverts of the male are greatly elongated, usually from twenty to thirty inches. It clings to the limbs of trees similar to the woodpecker, since its feet are not well adapted to walking. The male is richly colored and has fine plumes on the wings, while the female is less attractive. This bird has been adopted as the national symbol of Gautemala. Its plumes and feathers are used extensively for millinery trimmings.

QUETZALCOATL (kets-al-ko-at'l), the mythical hero and king of the Aztecs, who was worshiped as the god of commerce and the industries. It is supposed that he resided in the ancient city of Tula, or Tollan, about forty miles north of the present City of Mexico, and extended the influence of the Toltecs, so named from their chief city, over a large tract of country through peaceful means. According to some writers he predicted the conquest of Mex-

ico by the Spaniards.

QUEZALTENANGO (kā-sāl-tā-nān'gō), a city of Guatemala, Central America, capital of a province of the same name, 68 miles northwest of Guatemala. It is situated on an elevated tableland and has a fine cathedral and several government buildings. Among the manufactures are cotton and woolen goods. Alvarado founded the city in 1524. Population, 1918, 24,537.

QUICHUA (ke-choo'a), the name of one of the four divisions into which the ancient Peruvians were divided, the others being the Changos, the Atacamas, and the Aymares (Incas). Each of these families spoke a distinct language, but those of the Quichuas and the Incas were quite similar, hence some writers regard them as dialects of a common tongue. The Quichuas became subject to the Incas and constituted the more powerful class in their empire, occupying Cusco, the capital, and a vast extent of the surrounding country. At present their descendants constitute about three-fourths of the Indian population of Peru and Bolivia, where their language is still spoken by a large number. These people are small in stature, but have broad chests and are capable of enduring long and severe exertion. The skin is olivebrown or bronze, instead of being coppery like the Indians of North America. Previous to the conquest they had made considerable prog-ress in science. They observed the solstices and equinoxes, had a decimal system of numeration, and cultivated music and poetry.

QUICK, Robert Herbert, educator, born in London, England, in 1831; died in 1891. He studied at Cambridge University, where he graduated in 1854, and was ordained as a minister of the Anglican Church. After assisting in ministerial work at Cranley and Harrow, he became lecturer on the history of education at Cambridge. Besides contributing to periodicals and works of reference, he edited Locke's "Some Thoughts Concerning Education" and published "Essays on Educational Reformers."

QUICKSANDS (kwik'sandz), the masses of loose and moving sand found at the mouths of rivers and on many seacoasts. They are formed on flat shores over beds of stiff clay through which water cannot penetrate, thus constituting a loose mixture of sand and water. Quicksands frequently occur in the vicinity of curves in narrow channels. In the latter case sand is carried by strong tidal currents to a favorable locality, where it is kept in a loose condition by moving water. Though not commonly of great extent, quicksands are dangerous to vessels or to persons, since they form an obstruction to passage and are so permeated with water that they are incapable of supporting the weight of a person. Quicksand is a term applied frequently to strata of loose sand, which in many regions carry large veins of water.

QUILLER-COUCH (kwil'ler-kooch'), Arthur Thomas, author, born in Cornwall, England, Nov. 21, 1863. He studied at Clifton College and Trinity College, Oxford, where he graduated with high honors. After taking his degree, he was classical lecturer at Oxford for two years, when he removed to London to engage in literary work. While there he was on the staff of The Speaker and contributed to other periodicals. His writings portray a vivid imagination, mastery of style, and critical study of the subjects treated. Many of his writings were published under the pseudonym Q. Among his books are "The Blue Pavilions," "A Procession of English Lyrics from Surrey to Shirley," "The Dead Man's Rock," "The Ship of Stars," and "The Adventures of Harry Revel."

QUILLOTA (kėl-yō'tà), a city of Chile, on the Aconcagua River, 23 miles northeast of Valparaiso. It is one of the oldest cities of Chile and has railroad facilities. The surrounding country is rich in minerals, especially copper. It has a number of educational buildings, several churches, and a considerable trade. The city suffered severely from earthquakes in 1822 and 1851. Population, 1917, 13,382.

QUIN, James, noted actor, born in London, England, Feb. 24, 1693; died in Bath, Jan. 21, 1766. He was of Irish descent and made his first appearance on the stage at Dublin in 1714, but soon after engaged at the London Drury Lane theater. His eminence rests largely on his ability as a tragic actor, but he was likewise efficient in characters of a comic and

sarcastic nature. In 1717 he engaged at Lincoln's Inn Fields, where he played the part of principal actor for seventeen years, and in 1734 returned to Drury Lane theater. Quin remained the most eminent actor in Great Britain until the appearance of Garrick, in 1741, and ten years later withdrew from the stage to his permanent residence at Bath. Among the plays in which he took a prominent part are "Tamerlane," "Beggar's Opera," and as Falstaff in the "Merry Wives of Windsor." It is thought that he has never been excelled in the rôle of Falstaff.

QUINCE, a tree of the apple family. It is native to the western part of Asia, but has been naturalized in many regions and is cultivated extensively for its fruit. The tree seldom ex-



PORTUGUESE QUINCE.

JAPAN QUINCE.

ceeds a height of twenty feet. It has oval leaves, irregular branches, and white or pale red flowers. The fruit grows singly on young branches and has a yellow or orange color. When plucked from the tree it is hard and too austere to be eaten, but is valuable for boiling in sugar or to be made into preserves or jelly. A kind of preserve made from quinces is called marmalade. Quinces are used in making a beverage similar to cider. The seeds are demulcent and mucilaginous and are used to some extent in medicine. The Japan quince is a small tree, about six feet high, and is cultivated chiefly for its early and large, profuse flowers. The Greeks and Romans cultivated the quince extensively. At present it is grown in many sections of America and Europe.

QUINCKE, Georg Hermann, physicist, born at Frankfort-on-the-Oder, Germany, Nov. 19, 1834. He graduated at the University of Berlin, where he was granted the degree of doctor of philosophy in 1859, and subsequently studied at Heidelberg and Königsberg. In 1859 he became teacher at the University of Würzburg and later at Heidelberg. Besides giving

studious attention to the investigation of capillary phenomena, he did much to extend knowledge of the laws governing the reflection of light from metallic and other surfaces. He conducted experimental work in studying electrical forces and contributing to the field of science, especially physics and chemistry. He contributed many articles to Wiedemann's Annals of Chemistry and Physics.

QUINCY (kwin'zi), the sixth city of Illinois, county seat of Adams County, on the Mississippi River, 260 miles southwest of Chicago. It is on the Chicago, Burlington and Quincy, the Wabash, and the Quincy, Omaha and Kansas City railroads, has a fine site on bluffs overlooking the river, and is the center of a large commercial and manufacturing trade. The

streets are substantially paved and lighted by gas and electricity. A street railway system penetrates all parts of the city and has lines to many interurban points. The noteworthy buildings include the county courthouse, the public library, the high school, the State Soldiers' and Sailors' Home, the Saint Mary's Institute and the Chaddock College (Methodist). It is the seat of the Saint Francis Solanus College. Other features include the Federal building, a conservatory of music, and Washington and Riverside parks. It has many fine churches. Among the manufactures are carriages and wagons, paper, furniture, musical instruments, tobacco products, packed meat, engines, hardware, and machinery. The place was platted in 1822 and was incorporated as a city in 1839. Population, 1900, 36,252; in 1910, 36,587.

QUINCY, a seaport of Massachusetts, in Norfolk County, seven miles southeast of Boston. It is on the New York, New Haven and Hartford Railroad, has a fine harbor on Ouincy Bay, and is located between the Fore and the Neponset rivers. The area is about 21 square miles. In the vicinity are extensive granite quarries, which were connected in 1826 with the first steam railway built in the United States. The city has manufactures of earthenware, boots and shoes, utensils, cigars, quarry products, and clothing. It has Adams Academy, a public library, and a home for infirm sailors. Other features include the Thomas Crane Library, the Wood Institute, and the city hospital. Quincy was the birthplace of John Hancock, John Adams, and John Quincy Adams, and the tomb of the two Presidents Adams is beneath the portico of the Adams Temple, a church erected in 1828. The first settlement in the vicinity of Quincy was made in 1625 and the town was a part of Braintree until 1792, when it was detached and named after

John Quincy. Population, 1910, 32,642. QUINCY, Josiah, eminent lawyer, born in Boston, Mass., Feb. 23, 1744; died April 20, 1775. He graduated from Harvard University

in 1763, took a law course, and attained to high rank as a lawyer. He denounced the stamp act and other measures imposed by Parliament upon the colonists in a series of articles in the Boston Gazette, which he signed Hyperion. In 1770 he and John Adams defended Captain Prescott and the British soldiers implicated in the Boston massacre, on March 5, 1770, though neither of these men was in accord with the policy of the government. He published an able work in 1774, entitled "Observation on the Boston Port Bill," and in the same year went to England as a confidential agent of the colonists with the view of strengthening the American cause. His death occurred while on the return journey to America, off Gloucester, Mass. Quincy was eminent because of his ability as a lawyer and gift of oratory. His health was delicate from early youth.

QUINCY, Josiah, author and statesman, son of the former, born in Boston, Mass., Feb. 4, 1772; died there July 1, 1864. He graduated



JOSIAH QUINCY.

from Harvard University in 1790, took a law course, and became identified as a leading member of the Federal party. After serving in the Massachusetts Legislature, he was elected to Congress in 1804, where he was distinguished as an orator and opponent of the policy of Jefferson and Madison. Among his most noted speeches

are those against slavery and in opposition to the Embargo Act and the Louisiana Purchase. He declared the latter as sufficient cause for the dissolution of the Union. He remained a member of Congress until 1813, when he declined a reëlection because of the overwhelming success of the Democratic party and the War of 1812, and devoted his attention principally to agriculture. However, he entered the senate of Massachusetts a few years later, was mayor of Boston from 1823 to 1828, and served as president of Harvard University from 1829 to 1845. While officiating in that capacity he introduced marking regulations and installed a large telescope. Among his principal writings are "History of Harvard University," "History of the Town and City of Boston," "Essays on the Soiling of Cattle," and "Life of John Quincy Adams."

QUININE (kwi'nin), the most important alkaloid obtained from true cinchona bark, first discovered in 1811. It is extracted from the bark with diluted sulphuric acid and, to precipitate the alkaloid, a quantity of lime is added to the solution. The deposit is then collected and dried and afterward it is exhausted with boiling alcohol, which dissolves the alkaloids.

When the filtered alcohol solution is evaporated, the quinine is neutralized with sulphuric acid and the solution is concentrated until the sulphate crystallizes. Quinine is very bitter. It is

almost insoluble in water, but is soluble in about its own weight of alcohol and in 22 times its weight of ether. Its salts are used extensively in medicine on account of their tonic and antipyretic qualities, especially in malarial affections of all kinds. Its extraordinary value has given rise to a considerable trade in



CINCHONA.
Fruit and Flower.

Peruvian bark, and the cinchona tree is now cultivated in many parts of America and Europe.

QUINOA (kwi-no'a), an annual herb native to the tropical parts of America, closely allied to and resembling the common pigweed. It attains a height of from four to six feet and yields a white seed of value as food. The plant is cultivated in Chile, Mexico, and other countries, where its seed is ground and used in making cakes, porridge, and other articles of food. The red quinoa is a closely allied species and yields red seeds containing medical properties used in treating bruises and sores. The quinoa plant has been naturalized in Europe, where the leaves are used as a substitute for spinach and the seeds serve as food for poultry.

QUINSY (kwin'zy), an acute inflammation of the throat, chiefly of the loose tissue surrounding the tonsils, hence frequently called tonsilitis. It is rarely confined to the tonsils themselves, but involves the soft palate, the uvula, the pharynx, and sometimes the root of the tongue. It is more prevalent during middle life and rarely affects children or persons advanced in years. The early symptoms are chills and discomfort about the throat, which are followed by severe pain and swelling of the tonsils. In severe cases it is difficult to move the jaws and delirium sometimes accompanies high fevers, but the malady is rarely fatal. It becomes dangerous through ulceration that sometimes involves a branch of the carotid artery. A mild purgative and the use of warm water as a gargle are common remedies, but stimulant and astringent gargles are used in advanced

QUINTILIAN (kwĭn-tĭl'ī-an), Marcius Fabius Quintilianus, Roman advocate and rhetorician, born at Calagurris, Spain, in 36 A. D.; died about 118 A. D. He was the son of a teacher of rhetoric, studied at Rome under Domitius Afer, and became noted as a Roman advocate. From the year 61 to 68 he resided in Spain,

but in the latter year he accompanied Galba (q. v.), the future emperor, to the Roman capital. For nearly twenty years after the accession of Galba he was noted as a teacher of rhetoric and oratory, and among his students were such eminent men as Pliny the Younger and the two grand-nephews of Domitian. Emperor Domitian conferred upon him the consular dignity, and he attained to distinction as a pleader in the courts. He retired to private life about the year 89 to devote his attention to his great work, entitled "De Institutione Oratoria," a treatise on rhetoric in twelve volumes. It was written in a period of two years, and, besides containing an elaborate treatise on rhetoric, it includes valuable criticisms and opinions of Greek and Roman writers.

OUIPU (ke'poo), an aboriginal device for recording and conveying information, formerly used in various parts of Asia, Africa, and America. It consisted of a series of colored and knotted strings tied at one end to a thicker cord, and the order, color, and knots of the strings were used like elements of a written language. The earliest instrument of this kind is said to have been invented by Emperor Suy-yin of China, and the Chinese are thought to have used quipus until this form of keeping records was superseded by the art of writing. The Incas of Peru used quipus at the time those regions were invaded by the Spaniards, both for recording intelligence and conveying commands to officers. In some instances these devices were used for preserving accounts of historic events.

QUIRINAL (kwir'i-nal), one of the seven hills occupied by the ancient city of Rome, located a short distance north of the Palatine. West of it is the Campus Martius, which extends to the Tiber. In the time of the ancient Romans it contained a shrine of Fortuna, the temples of Quirinus and Flora, and the great baths of Diocletian and Constantine. Pope Gregory XIII. began the building of the Quirinal Palace in 1574. This structure was a summer residence of the popes until 1870, when it became the residence of the King of Italy. It is decorated with beautiful works of art, including Overbeck's painting that commemorates the flight of Pius IX., in 1848.

QUIRINUS (kwi-ri'nus), one of the gods in the religion of the early Romans, ranking next to Jove and Mars. He represented the god of war during the time of peace, being in some respects parallel to Mars, who was looked upon as the war god at all times. Some writers think that he was identical with Romulus, who was honored by the festival of Quirinalia, which occurred annually on the 17th of February, that is, the 13th day before the Calends of March in the Roman system. The temple of Quirinus was located on Quirinal Hill.

QUIRITES (kwi-ri'tez), the name used by the Romans to designate the civil capacity of their citizens, while Romani indicated the military and political relation. While the term was a title of honor in the nation, the Quirites were looked upon with reproach in the army, since the soldiers regarded them fit only for civilians.

QUITCLAIM (kwit'klām), the name of a deed which conveys the right or interest of a grantor in real estate without any warranty whatever of the title or quantity. In such an instrument the grantor or seller conveys to the grantee or buyer all his right, title, interest, and estate. The formal words employed usually in such an instrument are "remise, release, and forever quitclaim."

QUITO (ke'to), the capital and largest city of Ecuador, in the province of Pichincha, near the eastern slope of the volcano of Pichincha. It is situated about 9,350 feet above sea level and its pleasant and temperate climate makes it one of the most beautiful cities of South America. The atmosphere is almost constantly clear and bracing, resembling that of perpetual spring. Its principal streets are regularly platted and well paved, but those in the older parts of the city are narrow and neglected. It has systems of waterworks and sewerage, but the street lighting still consists of gas and kerosene lamps, while the absence of railroads and substantial highways greatly interferes with commercial enterprise. Among the important buildings are those maintained by the government, including the capitol, the president's palace, the court-house, and the townhouse. The University of Quito is the principal educational institution, but it has numerous schools and convents, a seminary, an observatory, several hospitals and asylums, a museum, and a public library of 25,000 volumes. The cathedral is a substantial structure, being well built and finely decorated, and it has a large number of other churches and monasteries. Quito is the seat of an archbishopric and is noted as a gathering place and the home of many priests, fully 500 residing here. Among the manufactures are cotton and woolen spirituous liquors, jewelry, hosiery, lace, and utensils. The city was foundgoods, thread, lace, and utensils. The city was founded by the Spaniards in 1534 and suffered at various times from the effect of earthquakes, particularly in 1859, when many lives and about \$3,000,000 worth of property were destroyed. The inhabitants consist principally of descendants from Spaniards and Indians, but likewise include many pure-blooded Spaniards and Indians in the city. Population, 1916, 81,405.

QUOITS, a game in which the player strives to pitch a flattened ring of steel so as to encircle a peg or hob stuck upright in the ground. The rings measure from eight to ten inches in external diameter, the rim being one or two inches wide. Two pegs or hobs of wood or iron are set upright in the ground, usually eighteen yards apart, and the player who gets the greatest number of quoits nearest the pegs is the winner. Each player has two quoits, which are pitched alternately. If a player

pitches a quoit nearer the hob than either of his adversaries, he gains one point; if both his quoits are nearer than those of his adversary, he scores two points. If a quoit leans against the peg, it counts three, but if it encircles the peg, it scores five. However, if both players encircle the peg with one or both of the quoits, only the upper one is counted. Horeshoes are used extensively in playing this game. Each side may consist of one or more players.

QUORUM (kwō'rum), the name applied to such a number of persons of any deliberative or corporate body as is necessary for the legal transaction of business. If no specific rule as to the number required has been adopted by the body, a quorum consists of a majority of the members. It is customary for most bodies to adopt rules providing that a majority of the members shall constitute a quorum, though a greater number may be required for special purposes, and in some bodies less than a ma-

jority may be made a quorum by a rule. For instance, forty members constitute a quorum in the British House of Commons. The Constitution of the United States provides that a majority of each house of Congress shall constitute a quorum to do business, but a smaller number may adjourn from day to day, and may instruct the sergeant-at-arms to compel the attendance of absent members. It was held during the first fifty congresses of the United States that the constitutional quorum must be shown to be present by the count of votes, but in 1890 Thomas B. Reed, then speaker, ruled that he might decide a quorum to be present when enough members were visibly present, though some did not vote. This position has since been generally supported and it is now held that if a majority be present to do business, their presence is all that is required to make a quorum in either house of Congress.



RABBIT

R, the fourteenth consonant and eighteenth letter of the English alphabet, which is classed as a semivowel and a liquid. It is generally considered to have two sounds; one at the beginning of a word or syllable, or when it is preceded by a consonant, and the other at the end of a word or syllable, or when it is followed by a consonant. In the former case it is pronounced by an explosion of vocalized breath, the tongue almost touching the palate or gum near the front teeth with a tremulous motion, and in the latter it is formed by a vibration of the lower part of the tongue, near the root, against the soft palate. The former use is illustrated by such words as tree, ran, and morose; and the latter by the words her, star, and beard. The Three R's, a term familiarly used to designate the three elementary subjects of education, reading, writing, and arithmetic, originated with Sir William Curtis. In this relation they are often spoken of as reading, 'riting, and 'rithmetic.

R

RABAT (rā-bāt'), a maritime city of Morocco, in the province of Fez, 135 miles southwest of the Strait of Gibraltar. It is situated near the place where the Bu-Regreg flows into the Atlantic Ocean and is defended by a wall, citadel, and batteries. It has many mosques and the tower of Beni-Hassan, a structure 180 feet high. The manufactures include silk and woolen goods, carpets, saddlery, waterproofs, and leather. It has a large trade in wool, dyestuffs, olive oil, wax, and tropical fruits, though commerce has somewhat declined on account of silt settling at the mouth of the river. Rabat was founded in the 13th century and was long a haunt of pirates. Population, 1918, 27,146.

RABBA (räb'bä), a city of Western Africa, in the native kingdom of Gando, on the Niger River, about 350 miles from its mouth. It has an extensive trade in ivory and tropical products. Among the manufactures are cotton and woolen goods. Formerly it was important as a slave market. Population, 1916, 41,040.

RABBAH, a city of the Ammonites, in the valley of the Jabbok, 25 miles northeast of the Dead Sea, known at present as Amman. David and Joab captured it after a siege (II Sam. x-xii). It was afterward occupied by Ptolemy

II., who renamed it Philadelphia. Among the Ammonites it was known as Ammon, but the same name was applied to several other cities, including the Ammon which was located in the mountains of Judea.

RABBI (rab'bī), a title applied to persons having judicative and other special authority among the Hebrews, corresponding in meaning to the English word master. The title was in common use among the Jews in the time of Christ, who was thus addressed by His disciples. It is now applied to any teacher who is not a priest, especially to learned doctors of the Jewish law. Rabin is the equivalent French form, meaning my master, and rabbon is an Aramaic form, meaning our master.

RABBIT, a genus of rodent mammals, belonging to the same family as the Hares, though they are smaller and have shorter ears and hind



GRAY RABBIT.

legs. It is thought that rabbits were found originally in the western portion of the Mediterranean basin, but they have been widely naturalized and are met with in all regions, except those that have an extremely cold climate. The color in a native state is almost uniformly brown, but under domestication it may become varied, including black, white, gray, and spotted. Like the hare, it is timid and seeks safety by rapid and continuous running, and by retreat-

ing to burrows excavated in hill slopes and sandy pastures. It is gregarious in habit and in a wild state pairs for life, though in domestication it ceases to pair. The young are brought forth in litters numbering from three to eight, and are blind and naked at birth, but the mother attends to them with marked affection in burrows. They begin to breed at six months and have several litters each year. The average life of a rabbit is from seven to eight years. They have well-developed senses, but remain concealed the greater part of the day, coming out at early twilight to roam about in search of food. Rabbits feed on grass, herbage, vegetables, and bark, often inflicting considerable damage to young plants and orchards.

Many species of rabbits are widely distributed in North America, including the gray rabbit, or cottontail. This species is particularly abundant in the Mississippi valley and Southern Canada, where it is hunted in the fall and winter for its flesh. The best time to go upon a rabbit chase is directly after a newly fallen snow, when these animals may be tracked successfully to their burrows or places of hiding. The flesh is not eaten during the summer and is best in the fall, shortly after the animals have become fat on the grain found in the fields. Rabbits were not imported into Australia and New Zealand until 1860, but they are now a common pest in many sections for the reason that the climate is exceedingly favorable to their multiplication, and because few enemies are found there to diminish their numbers. many sections they have become harmful to vegetation, eating and destroying crops, pastures, and young trees. Domesticated rabbits have been greatly modified by the skill of breeders and now vary greatly in size and color. Albinos are very common and include a remarkable species with white hair and red eyes. Besides being valuable for food, rabbits yield skins of use in making glue and size, and the hair is well adapted for felting purposes. The fur is useful for articles of wearing apparel, or for imitating the rarer and more costly furs.

RABELAIS (rà-b'-là'), François, humorist and satirical writer, born in Chinon, France, about 1490; died at Paris in 1553. He was the son of a farmer and about 1519 entered the Convent of Fontenay le Comte as a member of the Order of Saint Francis. While there he devoted himself with much ardor to the study of Latin and Greek and many modern languages, including Italian, German, Spanish, Hebrew, and Arabic. In 1530 he was admitted as bachelor and shortly after began the study of medicine at Montpellier, where he secured a medical degree and received an appointment as lecturer. In 1532 he was engaged as hospital physician at Lyons, where he published several works bearing on medicine and jurisprudence. He visited Rome with the Bishop of Paris, Jean Du Bellay, whom he accompanied as traveling

physician, and, after returning to France, continued the practice of medicine at Montpellier. In 1546 he settled as physician at Metz, but received an appointment as curé of Mendon in 1551, in which capacity he passed the remainder of his life.

The treatises of Rabelais on scientific subjects have long since been forgotten, but his "Gargantua and Pantagruel" continues to be classed among the most humorous and grotesque masterpieces of the world. This work appeared in five books, but the fifth was left in manuscript. Rabelais is generally credited with a happy and blameless life, one devoted to the relief of suffering and the spread of culture. His publications place him before us as a reformer of social abuse's practiced in his time, and they may be regarded as satirical criticisms of the corrupt state of society of his age. The charge of irreligion and atheism was preferred against him and his works at different times, but there seems to have been little or no ground for such inferences, since his writings were characterized by the peculiar free tone assumed generally by him and his contemporaries.

RACCOON (răk-koon'), an American quadruped mammal of the bear family, which is found from Canada to the tropics. The head



RACCOONS.

is broad behind, the muzzle is narrow, the ears are short, and the tail is ringed and moderately long. Raccoons are somewhat larger than a large cat, but they are built more heavily, have short legs, brown furry hair, and claws well adapted for climbing trees. The body is about 22 inches long and the tail measures 12 inches. They make their homes in hollow trees and burrows in the ground during the day, but at night come out in search of food and water. The food consists of vegetable and animal matters, particularly of crabs, oysters, crawfishes, green corn, and tender shoots of plants. Their flesh is a favorite article of food, for which they are hunted in the fall and winter. The crab-eating raccoon, or agouara, is native to South America and ranges as far north as Panama. It differs from the common raccoon of North America in having a more slender shape and shorter fur. Both species are remarkable for displaying a fondness for glittering things, a trait likewise found in magpies and jackdaws.

RACE, a competitive contest of speed, including such as running, skating, riding, driving, rowing, and sailing. Racing may be a concest between individuals, as in walking and swimming; a test of machines, as in bicycle and automobile racing; or a test of speed in animals, as in driving and running horses. Sports and exhibitions of this class are very popular in Europe and America and are prominent as distinct competitive tests, or as features in fairs and exhibitions. Within recent years many of the contests assumed the distinctive feature of extending to great distances. Running foot races are usually confined to spaces ranging from fifty to eighty yards, but more recently they have been extended to include contests that cover distances of 25 miles or more. In 1908 the most extensive racing contest in the world was undertaken, in which automobiles were registered to join in a race from New York City, to Paris, France, by way of Bering Strait and the line of the Trans-Siberian Rail-Yacht races and rowing contests have assumed international proportions, such as those held at various periods between representatives of Great Britain and the United States.

Horse racing is one of the most popular sports and has been greatly modified by careful breeding and training of several species of the These contests are concerned in obhorse. taining the highest possible speed for comparatively short distances. Horses are entered for racing contests according to the class in which their record as to speed entitles them to run, and the races are again divided into those provided for runners, trotters, or pacers. running record takes precedence of all others, since horses excel in running rather than in pacing or trotting. A mile is usually taken as the standard and the contest is on a circle of that distance. Running records of a mile in one minute and fifty seconds are high and are considered equally good to a pacing record of 2:15 and a trotting record of 2:18. Laws against gambling at race tracks have been passed by a number of states and provinces, such as the Agnew-Hart bills that were enacted into law in New York, in 1908. These laws have had a tendency to lessen interest in horse racing somewhat in the larger cities, but they have directed attention more closely to the development of speed rather than to the former practice of bookmaking and gambling.

RACES OF THE WORLD. See Ethnol-

ogy.
RACHEL (rā'chĕl). See Jacob.

RACHEL (ra-shěl'), Eliza, tragic actress, born at Mumpf, Switzerland, March 24, 1821; died in Cannet, France, Jan. 3, 1858. She descended from Jewish parentage, but is usually

classed as a French actress. Her father's name was Jacob Félix and her true name was Élizabeth Félix, Éliza Rachel being her stage name. Both her parents traveled on foot through France as pecdlers, and she joined a troupe of Italian children at Rheims to earn her living as a singer in the cafés and on the streets. Her parents settled at Paris in 1830, where she received instruction from a teacher of singing who had been impressed with her talent, and in 1832 she was received in the Conservatoire. In 1837 she made her first appearance on the stage at the Gymnase at Paris, but attracted little attention until the following year, when she excited much admiration by appearing in the classic productions of Racine and Corneille at the Théatre Français.

Her favorite rôles included Camille in "Les Horaces," Emilie in "Cinna," Hermione in "Andromaque," and Monime in "Mithridate," but she also played successfully in the modern characters of Judith and Cleopatra. She made a tour of Europe in 1849, visiting Berlin, Saint Petersburg, Vienna, and London, and everywhere received applause and admiration. In 1855 she made a tour of the United States, but returned to Europe sorely afflicted with consumption of the lungs. Mlle. Rachel had no rival in the height of her prosperity and her immense success brought a large fortune, which she lavished in a most affectionate manner upon her whole family. It is said that she was grasping and avaricious in making contracts with managers of theaters, always dictating her own terms in the engagements, undoubtedly realizing that her services were in demand.

RACINE (rå-sēn'), a city of Wisconsin, county seat of Racine County, on Lake Michigan, at the mouth of the Root River, 62 miles north of Chicago, Ill. It is on the Chicago and Northwestern and the Chicago, Milwaukee and Saint Paul railroads. An excellent harbor is afforded on the lake, permitting the entrance of the largest vess ls. The site is about forty feet above the lake and the city is regularly platted, having broad and well-improved thoroughfares. It has a large trade in lumber, grain, and merchandise. The manufactures include furniture, carriages and wagons, steam engines, lumber products, linseed oil, woolen goods, rubber clothing, machinery, malted milk, and farming implements.

Racine is well built of brick and stone. Among the noteworthy buildings are the county courthouse, the city hall, the high school, the Federal building, the public library, and many fine churches. It is the seat of the Racine Academy, the Racine College, the McMurphy Home School, the Saint Catharine's Academy, the Saint Luke's Hospital, and the Taylor Orphan Asylum. Among the public utilities are street pavements, systems of waterworks and sanitary sewerage, and electric street railways. The first settlement on its site was made in 1834.

It was incorporated as a village in 1843 and as a city in 1848. Population, 1910, 38,002. RACINE, Jean Baptiste, dramatic poet,

born at La Ferté-Milon, France, Dec. 21, 1639; died in Paris, April 22, 1699. Both his parents



JEAN BAPTISTE RACINE.

died while he was yet young and he was raised by his maternal grand mother, who sent him to the College of Beauvais at an early age. His grandfather died when he was sixteen years of age, and he was sent to Port Royal to live with other relatives, where he studied advanced branches

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and languages. His educational study was finished at the College d'Harcourt, where he met distinguished scholars and formed a devotion for a life of letters.

The first tragedy of Racine was acted at the Palais Royal Theater by Molière's company, in 1664, and in the following year his "Alexandre," was presented on the stage. This production placed him before the public as a rival of Corneille and he was granted a pension of 600 francs by the king for a congratulatory ode. From this time he wrote many plays showing extraordinary genius, among them his celebrated "Andromaque," a production in which Rachel appeared with much success as Hermione. In 1677 he married a devout lady, who became the mother of two sons and five daughters, and the later part of his life was spent principally in several public offices under the king. These included an engagement as historiographer with Boileau, in which capacity he accompanied the king in his campaign to Flanders. Racine was essentially French in his dramatic writings, which comprise the greater part of his works, but he is the author of a number of odes, hymns, and epigrams. He is held to be without a rival in the grace and tender style of his writ-

RACK. See Torture.

RADCLIFFE (răd'klif), Ann Ward, novelist, born in London, England, July 9, 1764; died there Est. London, England, July 9, 1764; died from a there Feb. 7, 1823. She descended from a family named Ward and in 1787 married William Radeliff liam Radcliffe, a student of law, who became editor of The English Chronicle. She is preeminent as a writer of novels characterized by poetic imagination and possessed remarkable power of description and romantic narration. Her best known works include "Romance of the Forces" "The Italthe Forest," "Mysteries of Udolpho," "The Italian," "Sicilian Romance," "Journey Through Holland," and "Gaston of Blondeville." She received \$1,500 for the copyright of "Mysteries of Udolpho," and \$2,000 for that of "The Italian," which sums were regarded very high at that

RADCLIFFE COLLEGE, an institution of higher learning for women, established at Cambridge, Mass., in 1879, under the auspices of the Society for the Instruction of Women. Although it had no official connection with Harvard University, it was named Harvard Annex. In 1893 the name was changed to Radcliffe College in memory of Anne Radcliffe, who was the first woman to give a money endowment to Harvard. Only certificates were granted to students prior to 1893, but degrees are now signed by the president of Harvard University. The library has 30,500 volumes and the courses of instruction are similar to those of Harvard University. About 600 students attend the institu-

RADETSKY (rå-děts'kė), Joseph Wenceslaus, Count of, eminent soldier of Austria, born at Trebnitz, Bohemia, Nov. 2, 1766; died in Milan, Italy, Jan. 5, 1858. He descended from a noble family, entered a cavalry regiment in 1784, and served against the Turks under Joseph II. in 1788-89. It may be said that he took an eminent part in all the great battles of Austria, including the battles of Hohenlinden, Wagram, and Leipsic, and in 1814 accompanied the allied forces into Paris. In 1830 he was called to Italy to suppress the disturbances that followed the French revolution of that year, and in 1831 received full command of the Austrian army in Italy. He was made field marshal in 1836 and in 1857 retired from the service.

RADIATA (rā-dǐ-ā'tà), the name of the lowest of the four great divisions into which Cuvier classified the animal kingdom. It includes those forms in which the parts radiate from a central axis. These parts include both the organs of sense and those of motion. This classification went out of use in the latter part of the 19th century, when the animals included in it were divided into protozoa and coelenterata.

RADIATOR (rā'dĭ-ā-tēr), a hollow vessel or coil of pipe through which is passed steam, hot water, or air for warming a building or an apartment. Coils of pipe are used principally and the arrangement and appearance differ more or less. In heating by steam it is necessary to provide a boiler partially filled with water, which is connected with the radiators in the different apartments by pipes. Provisions are necessary by which all the condensed steam may return automatically to the boiler, as otherwise the radiator would soon fill with water and cease to radiate heat. Systems utilizing water are constructed in much the same way, differing only in that a continuous system of pipes articulates with a heater. These and the radiators are filled with water, which begins to circulate under the expanding influence of the heat applied in the heater, and a constant inflow of water is provided from a supply tank located in an upper story or from a city water system. The pipes which pass through basements or parts not intended to be warmed should be protected by asbestos wrapping, thus preventing the needless radiation of heat.

RADIOMETER (rā-dǐ-ŏm'ē-ter), an instrument for estimating the mechanical effect of radiant energy. It was invented by William Crookes and was first exhibited at the Royal Society, London, in 1875. The radiometer consists usually of a globe of glass from which the air has been exhausted, in which is a needle support carrying a rotating four-disk vane, colored white on one side and black on the other. When the instrument is exposed to light, revolution begins immediately, and the speed depends upon the intensity of the light. Twice the effect is produced when two candles are placed near it instead of one, and the vanes may be made to spin with great rapidity by exposure to an incandescent electric light.

RADISH (răd'ish), a fleshy plant grown extensively as a garden vegetable. It is thought to be native to India, where it was cultivated in



GERMAN DWARF RADISHES.

ancient times, and was brought from that country to Europe and America. The radish is planted for its root, which is eaten as a salad or relish when young. Gardeners usually sow the seed at various times in the same year, thus insuring young and tender plants at different periods, the older insipid and voody growths being inedible. Many species have been originated by cultivation, but all may be classed under two divisions, the long-rooted and the turnip-rooted. The root of the former resembles a carrot in form and the latter has the shape of a turnip, but the size and color vary greatly in the different species.

RADIUM (rā'dī-um), a radio-active metal discovered in 1898 by Professor Currie and his wife, Madame Currie, of France. It is obtained from pitchblende, a mineral consisting largely of oxides of uranium, but is difficult to procure in a pure state. It continually emits radiations of light and heat without combustion or an apparent loss of bulk or energy, but changes rapidly by oxidation. All of its properties are learned through its compounds, which are very similar to those of barium in color

and solubility. By its radio-activity it affects photographic plates through various opaque substances, discharges electrified bodies, and causes remarkable changes in living matter. The activity of this metal is measured by delicate electrical devices, which are far more sensitive than the spectroscope. Radium salts emit both heat and light and this property increases with the purity. The rays of radium reduce silver salts, transform white into red phosphorus, color glass and paper, and cause a sensation of light when brought near the closed eyes. Substances placed near radium salts become radio-active. The rays of radium cause serious burns when placed near the skin, not at once, but after a considerable time, which are difficult to heal.

Radium is employed in medicine for therapeutic purposes and to some extent for diagnostic uses. The best results have been obtained up to the present time in applications to such diseases as tuberculosis and in treating epithelial cancer. Chloride of barium is used to dilute the sulphide of radium, and in this form it is placed in a small rubber bag or disc, which is fastened upon the affected part for whatever time the physician thinks it is necessary to produce the desired results. Another method is to place the salt of radium in a small cylinder, the open end of which is held near or directly against the affected part. Since radium is exceedingly expensive and no two samples are of the same strength, it is employed with difficulty in the medical practice.

RADOM, a city of Poland, capital of a government of the same name, about 50 miles south of Warsaw. It is in a fertile section, on the Ivangorod railway, and has a large manufacturing trade. The Austro-Germans captured it in 1915. Population, 1914, 51,378.

in 1915. Population, 1914, 51,378.

RAE (rā), John, Arctic explorer, born in the Orkney Islands, off Scotland, in 1813; died in London, England, July 21, 1893. In 1846 he made a journey to Repulse Bay and joined the expedition under Sir John Richardson that went in search of Franklin in 1848. Five years later he proved by an accurate survey that King William's Land is an island and discovered many relics of Franklin's party. The British government awarded him \$50,000 for these services. Rae published interesting reports on the Esquimos and his Arctic expeditions.

RAFF (räf), Joseph Joachim, musical composer, born near Zurich, Switzerland, May 27, 1822; died June 25, 1882. He was born of German parents, studied at Schwyz, and formed the acquaintance of Mendelssohn and Liszt, who inspired the young musician by warm commendations. In 1850 he settled at Weimar to secure inspiration from Liszt, and there wrote many of his best known works. He married Doris Gemast, a reputable actress, in 1859, and in 1877 became director of the Conservatoire at Frankfort, a position he held until his death.

Raff belonged to the Wagner school of musicians. He displayed remarkable fertility of invention and all his works portray high artistic skill. Among the best known are "Dame Kobold," a comic opera; "King Alfred," a historic opera; and "Lenore" and "Im Wald," two symphonies.

RAFFAELLI (rå-få-lė'), Jean François, painter and sculptor, born in Paris, France, in 1850. He studied art in his native city and made his first exhibit in 1870. As a painter he produced much, especially landscapes and country scenes. His sculptures consist chiefly of portrait bas-reliefs. He was awarded a medal at the Universal Exposition in 1889. His paintings embrace works entitled "Young Girl with the Cornflower," "White Horse," "At Gonon's Foundry," "Old Ragpicker," and a series of views of Notre Dame.

RAFFIA (răf'fi-à), the name of a fiber obtained from the Jupati palm, used extensively in making matting and cordage. This tree is native to South America, where the natives gather the fiber and use it in making clothing. Large quantities of raffia are exported to the manufacturing centers of Europe and North America. Raffia weaving is a branch of kindergarten work in many schools of Canada and the United States.

RAFFLESIA (răf-flē'shǐ-à), a genus of plants native to the East Indies and the Philippines. Ten species have been described, all of which are parasitic. They are nearly rootless, stemless, and leafless, and consist almost entirely of flowers, which rise in the form of the heads of cabbage. One species bears a flower three feet in diameter, weighing about fifteen pounds, and this is the largest bloom in the world. It was discovered in 1815 by Sir Thomas Sandford Raffles, a British officer in Sumatra, from

whom the genus was named.

RAGLAN (răg'lan), Fitzroy James Henry Somerset, Lord, field marshal, born Sept. 30, 1788; died June 28, 1855. He was the youngest son of the fifth Duke of Beaufort, entered the army in 1804, and served on the staff of the Duke of Wellington in the Peninsular War. Wellington engaged him as secretary for the latter part of that war, and he distinguished himself in the capture of Badajoz. He lost his right arm in the Battle of Waterloo, but immediately began practicing writing with his left hand. In 1816 he was made secretary to the embassy at Paris and from 1819 to 1852 was military secretary to the Duke of Wellington. He attended the congress of Verona in 1822 in company with the duke, and after 1852 served as master general of ordnance. The House of Lords created him Baron of Raglan in 1852, but he had previously been a member of the House of Commons for Truro, from 1818 to 1826. He was made commander of the English forces at the beginning of the Crimean War, in 1854, becoming field marshal for services in the Battle of Inkerman. His death resulted shortly after from dysentery.

RAGNARÖK (răg'nà-rek), the name applied in Scandinavian mythology to the time when the world is to be dissolved, when the gods will come into mortal conflict with the spirits of evil. They thought that depravity and strife will herald the approach of this great event, when piercing winds will prevent the coming of summer. Then the ferocious wolf will be freed from its chains and the Midgard serpent will gain land, while the heavens will be rent in twain and the earth will become denuded of its vegetation. Odin, Vidar, and Thor are to be destroyed, and the earth is to be wrapped in fire and sunk beneath the sea. After Ragnarök has passed away, a new earth and a new heaven are to take the place of the old. It is to be the golden age of good and happiness, when the triumphant gods shall establish peace and good will among men forever.

RAGSTONE, a rough, impure limestone rock, which breaks into raglike fragments. It is well adapted for whetstones used in sharpening steel instruments. The name is generally applied to hard, irregular rock overlying better grades of building materials, but which is used

for building purposes.

RAG TRADE, the traffic in fragments of textile materials. Formerly these commodities were regarded valueless, but now they form important materials in manufacturing enterprises. Rags are collected at present with considerable care in all countries, but for centuries they were allowed to waste or were used to a very limited extent in stuffing saddlery. They are gathered in large quantities in Canada and the United States by persons traveling from house to house, but the demand for them is greater than the supply, hence considerable quantities are imported. Linen and cotton rags are consumed almost exclusively in the manufacture of paper. Bank notes, ledgers, and papers of light quality are made mostly of rags, but printing paper is made largely by mixing wood pulp with rags. Rags of woolen or worsted goods are not used in paper making, but are carefully sorted, the inferior portion being used for manure, while all the available loose texture is unraveled by machinery and, after mixing with good wool, is made into goods generally known as shoddy. The refuse matter remaining after carefully selecting the different grades is pulverized and used in making flock papers. In London and many other European cities companies are maintained to collect rags by utilizing the labor of children. This plan is employed in the larger cities of America, while in the country districts venders of trinkets and merchandise collect rags and fragments of metals, usually paying for them with tinware or small articles, such as handkerchiefs.

RAGUSA (ra-goo'za), a maritime town of Austria, in the southern part of Dalmatia, about

forty miles northwest of Cattaro. It was formerly an independent republic, but now possesses little of its former prosperity. The place is surrounded by a wall and has a number of machine shops and mills. Among the manufactures are clothing, oil, silk, leather, tobacco, soap, and utensils. It has a considerable export trade. Ragusa was founded about 656 by refugees from a city of the same name in Sicily, and in the time of the Byzantine Empire had a flourishing trade and important educational and manufacturing institutions. It became subject to Venice in the 12th century, but formed an independent republic at the beginning of the 15th century, which was finally overthrown by Napoleon in 1808. Both the town and the province became a part of Austria in 1814. Population, 1916, 13,447.

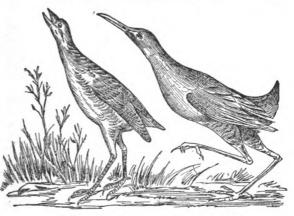
RAGUSA, an ancient city of Sicily, thirty miles southwest of Syracuse, fifteen miles from the Mediterranean. It is situated on the Ragusa River and occupies a site in the midst of a productive agricultural and stock-raising region. Among the manufactures are cotton textiles, woolen and silk goods, oil, wine, and utensils. In its vicinity are a number of ancient tombs and the city is surrounded by a substantial wall. Population, 1916, 32,422.

RAGWEED the name of an annual plant found in the Temperate Zone of Europe and North America. It is so named from the ragged appearance of its leaves. Some species are locally called hogweed, since they are eaten by swine. The flowers appear in clusters, usually golden-yellow in color. This plant thrives in rich, damp soil, and is usually found in pastures and along the highways.

RAHWAY (ra'wa), a city of New Jersey, in Union County, on the Rahway River, sixteen miles southwest of New York City. It is on the Pennsylvania Railroad and is the home of many New York business men. Among the features are the public library, the high school, the Y. M. C. A. building, and several parks. The manufactures include carriages, clothing, woolen goods, utensils, and machinery. Gas and electric lighting, sanitary sewerage, waterworks, and rapid transit are among the improvements. Population, 1905, 8,649; in 1910, 9,337.

RAIKES (rāks), Robert, the founder of Sunday schools, born in Gloucester, England, Sept. 14, 1735; died April 5, 1811. He succeeded his father as proprietor of the Gloucester Journal in 1757 and managed that periodical until 1802. In 1780 he originated the system of Sunday schools by gathering a number of children from the streets for religious training. The last thirty years of his life were devoted largely to promoting schools of this kind, and he lived to witness the extension of the Sunday school system throughout England.

RAIL, the name applied to many birds of the subfamily Rallinae, most of which are related to the coots and gallinules. These birds are widely distributed and include upward of 150 species. Among the familiar birds of this class are the rails proper, the water hens, the coots. and the crakes. The water rail of Europe and the Virginia rail of North America are quite similar and form representative types. They have a long bill, long and powerful legs, an olive-brown or a bluish-ash color, and are about eleven inches in length. These species are highly esteemed for their flesh. The Virginia rail is a bird of passage. It feeds on worms, mollusks, and soft vegetable substances, and is abun'ant in many parts of North America. It is very shy in its habits and, when detecting danger, escapes by passing swiftly through the reeds rather than by flight. The fresh-water marsh hen is about twenty inches in length



CAROLINA RAIL.

VIRGINIA RAIL.

and is abundant in the marshes of the Southern States. Its body is eighteen inches long, the bill has a length of three inches, and the weight is nearly two pounds. The mangrove hen is native to the West Indies, where it is found along the muddy shores and in marshes. The land rail is commonly known as corn crake and is about half the size of a partridge, but appears quite as large as that bird.

RAILROADS, or Railways, the graded roads having one or more tracks of metal rails supported by ties or sleepers, designed for the passage of rolling stock. It may be said that railroads are exclusively modern institutions, though similar improvements were utilized in a primitive way by the ancients. The Romans constructed grades and built tracks of two lines of dressed stones, connected end to end, so as to form hard, continuous surfaces for the passage of vehicles drawn by horses. Similar tracks constructed of two parallel lines of wooden beams, having flanges to prevent the wheels of the cars from leaving the track, were built in many parts of Europe early in the historic

period. However, these were built principally within mines for transporting material to the place of exit, or for the purpose of conveying the mineral products to the places of use or shipment. Tramways were in general use in connection with the mines of Europe in 1662, and about that time they began to be used for conveying freight. The rails consisted of timber and in 1676 additional wearing rails were provided to replace those worn out, and later flat strips of iron were nailed on the surface to add greater durability.

HISTORY OF RAILROADS. Cast-iron rails were first used in 1767. They were made in lengths of five feet and a cast-iron flange was soon after added to serve in keeping the wheels on



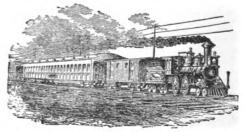
PRIMITIVE MODE OF TRAVELING.

the track. Nicholas Cugnot, a Frenchman, was the first to invent a steam engine of practical service in moving cars on a railway track. His engine was completed in 1769 and is preserved as a remarkable curiosity in Paris, and a full-sized model of it may be seen at the Chicago Field Columbian Museum. It has a pair of single-acting thirteen-inch steam cylinders, by which power is communicated to a single drive wheel, and was designed for transporting artillery. Though important as leading to the perfection of the steam engine, it is a mere toy when compared to the vast machines of modern structure.

The invention made by Cugnot stimulated many mechanical engineers and scientists of Europe to devote marked attention to the construction of a machine that would combine the qualities necessary to move cars safely and rapidly over rails. This ambition to add materially to practical engineering soon spread to America, and Oliver Evans, of Philadelphia, obtained a patent on steam carriages in 1787. Railroad building was delayed to a large extent by the construction of canals in many sections of Europe and America, and it was argued that no form of transportation could surpass water navigation from the standpoint of safety and low freight or passenger rates. Although this view was proved to be entirely correct, railroad building still remained a favorite theme of study, since it was desired to secure greater rapidity and to establish highways of travel and commerce where water navigation could not be utilized. It may be said that Oliver Evans is the

inventor of the high-pressure double-acting steam engine, since his first product of this class was completed in 1800. However, England claims that honor for Richard Trevithick, who, about the same time, constructed an engine to draw wagons on rails. Oliver Evans (q. v.) built a steam dredge in 1804, which was the first steam-propelled vehicle made in America that moved successfully. For many years engineers entertained the mistaken notion that locomotives cannot do their work successfully without having spur wheels, and mechanical engineers conformed their engines and tracks along that view, but a coal operator of England, in 1812, successfully demonstrated that smooth wheels run more easily and successfully on smooth rails. This having been satisfactorily established, nothing more was needed than to provide a machine that would possess the desired amount of speed. In 1814 George Stephenson made a practical success in building a locomotive for railroad use. It was built with money advanced by Lord Ravensworth and ran 35 miles an hour. The first railway opened in England was that from Stockton to Darlington, in 1825, and the second was built from Liverpool to Manchester in 1830.

NORTH AMERICA. The first railroad constructed in North America was projected in 1825 and extended from Quincy, Mass., to the nearest tidewater, about four miles. It was completed the following year and was used principally for carrying granite from the quarries near Quincy. The second railroad extended from mines near Mauch Chunk, Pa., to the Lehigh River and was completed in 1827. The New York Central was projected in 1825; the Boston and Albany, in 1827; and the Baltimore and Ohio, in 1828. In 1830 only 23 miles of railroads were completed and in operation in the United States. The engines used were of the Stephenson make and were imported from



MODERN MODE OF TRAVELING.

England. Since then many vast improvements have been made in building railroad tracks and rolling stock, and lines are now operated in nearly all sections of the United States and in the southern part of Canada.

The United States has a larger railroad mileage than any other country in the world. It has witnessed a marvelous extension of rail-

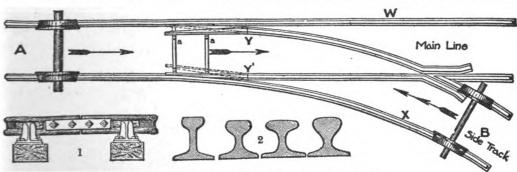
road mileage since 1830, not a single year having passed without material additions being made to the value and utility of these necessary highways of modern commerce. At the beginning of the Civil War, in 1861, that country had 29,739 miles of railroads, and in 1873 it had 70,268 miles. The following table contains an exhibit of interesting matters in railroad development during the decade ending with the last report of the United States:

YEAR.	TOTAL MILE- AGE.	TOTAL CAPITAL	TOTAL DEBTS.	NET EARNINGS.
1891	164,686	\$4,809,176,751	\$5,233,295,074	\$356,209,880
1892 1893	170,499 173,012	5,080,032,904	5,570,293,613	358,638,520 364,591,109
1894 1895	176,919 179,198			322,539,276 327,505,716
1896 1897	180,891 184,603	5,200,600,725	5,690,970,314	332,333,756 338,170,195
1898	187,340	5,240,728,254	5,727,364,201	341,244,580
1899 1900	190,833 195,133		5,753,123,790 5,800,542,870	356,280,760 361,080,203
1916	260,690	10,681,493,092	9,286,584,350	604,013,895

Construction. The first work in railroad building is to make a survey of the projected route between two places for the purpose of ascertaining the most practicable line, and for setting grade stakes to indicate the amount of cuts and elevations to be made. It is aimed to make the line as nearly level and straight as possible, since both are important factors in facilitating speed and promoting traffic without

the wood commonly used for that purpose including white oak, yellow pine, chestnut, and hemlock. Afterward the roadbed is treated with a process called ballasting, which consists of imbedding the ties in a layer of sand, gravel, earth, or crushed stone. At present the rails are made almost exclusively of steel. They are spiked at a certain distance or width from each other, called the gauge. Three different gauges, known as narrow, standard, and broad, are in general use throughout the world. However, the railroads are chiefly of the standard gauge, which is four feet eight and a half inches (1.435 meters) wide, and the rails are made principally of the T steel, so called from its resembling the form of the T turned upside down. One pair of parallel rails constitutes a single track of railway, two pairs, a double track; and with each system are a number of side tracks connected with the main line by switches.

EQUIPMENT. The cost of building the rail-road lines is only a portion of the general expense to be considered in construction and operation, since depots, freight offices, telegraph lines, and rolling stock are all important items to be added in estimating the general cost. Cars for the transportation of freight are variously constructed and include those designed particularly for way freight, grain, coal, oil, fruit, and other perishable commodities. The express and



A. Wheels passing the Y of the switch on the main line: B, wheels passing from the side track to the main line; 1, connection of rails at the ends and plan of mounting upon the ties; 2, cross sections of T rails.

DIAGRAM TO SHOW RAILROAD AND SWITCH.

needless expense. To do this it is generally made an object to follow the valleys of streams wherever practicable, though in many sections it is necessary to penetrate hilly and mountainous regions. In an undulating country railroad builders aim to have the cuts supply the necessary amount of earth to build the embankments required in carrying the grade over depressions. Tunnels are cut only through the higher hills and mountains. In many regions where snowstorms, or snowslides, prevail it is necessary to protect the portions of railroad tracks passing through cuts by snow fences.

After the grading is completed, the ties, or sleepers, are placed across the grade at a distance of about twelve inches from each other,

postal business is largely in connection with passenger trains, though on some lines the express and postal service is carried on trains designed especially for those purposes. The Baltimore and Ohio Railroad issued the first time-table for passenger trains in the United States in 1830. Sleeping cars were made as early as 1837, dining cars came into use in 1867, and George M. Pullman patented the vestibule car in 1887. Passenger trains of the first class are made up of cars fitted with two six-wheel trucks. They have electric or gas lights, hot water or steam heating, automatic air brakes, and automatic couplers, and include vestibule cars for dining and sleeping. In some of the finer cars are apartments containing a barber

shop, a smoking room, a bath room, a library, etc. The block signaling system is used on all first-class lines, thus providing practical safe-

guards against danger.

ELECTRIC AND OTHER RAILWAYS. Much activity has been displayed in building electric railways, which are so named because the cars, or trains of cars, are propelled by electric power. They are now utilized not only for urban and suburban passenger traffic, but have come into a wide use in the interurban districts for the conveyance of passengers, express, mail, and freight. In many cities railway lines are built above the streets, known as elevated railways,
 Great
 Britain
 24,164
 Russia
 48,130

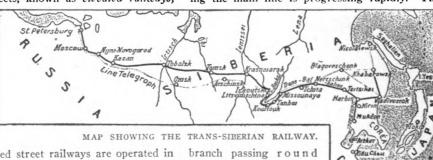
 Austria-Hungary
 29,432
 Germany
 39,943

 British
 India
 35,515
 United
 States
 260,690

 France
 31,285
 48,130
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 10,000
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Great Britain stands at the head of the list in the number of passengers carried in one year, namely 1,062,911,000. In the United States the number of passengers carried in a year is 965,300,000; in Germany, 925,600,000; and in France, 410,240,000. The Trans-Siberian Railway from Moscow to Dalny, a distance of 5,403 miles, is the longest line in the world, and from it are branches to Saint Petersburg, Port Arthur, and Vladivostok. Work on double-tracking the main line is progressing rapidly.

partly to overcome the dangers attending crow ded streets, and to make it possible to provide greater rapidity in the transit. Sys-



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tems of elevated street railways are operated in New York, Chicago, Berlin, London, Paris, Vienna, and other great cities of the world. Underground railways, or subways, are operated in New York, Paris, London, and elsewhere. Cable railways, which employ underground cables to propel the cars, are in use in some cities and in mountainous districts, being most serviceable in making steep ascents and descents.

RAILROADS OF THE WORLD. The total railroad mileage of the world is placed at 717,533 miles, of which 311,525 miles are in North America. The following is the mileage of railroads in the grand divisions according to the latest accounts: North America, 311,525; Europe, 200,519; Asia, 80,722; South America, 60,820; Africa, 38,487;

and Australasia, 25,460.

In some countries of Europe and Asia transportation is facilitated by canals, and the location of many commercial centers is such that they can be reached easily by navigation on streams and the ocean. This accounts in part for a smaller mileage than would seem adequate to transport interior trade when the population and industries are taken into account, but there are many regions where railroad construction would seem highly advantageous and no doubt will receive greater attention in the future. Railroad building is a material factor in the development of natural resources, especially in regions remote from the seaboard and where highways have not been improved. The countries having more than 5,000 miles of railroads at the end of 1911 are given in the list below, taken from the New York Railroad Gazette:

 Sweden
 9,242
 Australia
 22,825

 Spain
 9,447
 Italy
 11,881

 Mexico
 16,660
 Argentine
 21,479

 Brazil
 17,248
 British
 America
 35,379

the southern extremity of Lake Baikal was opened for traffic in 1904. In 1905 the Grand Trunk Railway Company secured the assent of

the Canadian Parliament

for a new Trans-Canadian Railway, from New Brunswick in the east to the Pacific in the west, which was projected to Dawson, Yukon, in 1909. The government of France has projected a Trans-African line across the Sahara, which will likely be completed within the next decade. It is to extend from Algiers to the west shore of Lake Tchad.

RAIN, the condensed vapor of the atmosphere falling to the earth in drops large enough to obtain sensible velocity. It differs from mist in that the latter falls in very small drops or particles, and from fog, which is composed of particles so fine as to be not only individually indistinguishable, but to float or be suspended in the air. A large amount of watery vapor is always present in the air, but warm air is capable of holding a much larger quantity than cold air. The vapor suspended in the atmosphere is derived by evaporation of water from the surface of the earth, by far the larger part being taken up from the ocean, though there is a considerable evaporation from the land and interior bodies of water. The quantity of moisture that the atmosphere may hold depends upon the temperature, and, when it contains all that it is capable of holding, it is said to be saturated, or at its dew point.

To produce rain, it is necessary that the temperature of a large mass of air be reduced considerably below its dew point. This condition may be brought about by a change of latitude, that is, a warm moisture-laden wind may blow into a cold region; or by a change of altitude resulting from an ascending current of air carrying the moisture of the lower strata into the upper regions. It is mainly in the latter manner that the rains of the tropical regions are caused, but the effect is similar in mountainous districts when a moist wind reaches a mountain range and is forced to ascend the slopes. Rain is also caused by the mingling of masses of cold and warm clouds, though the precipitation from this cause is never considerable, since the colder air becomes warmed by the mixing, and thus acquires greater capacity for holding moisture.

As raindrops fall through the cloud they become larger by other drops uniting with them, hence their size depends upon the density of the cloud. Generally they are larger in the daytime than at night and are larger in the tropics than in the polar regions. The air is purified by rain falling through it, and by the mixture of the upper and lower strata of air resulting from its passage through the strata. Rain has a wholesome effect upon the earth, since offensive gases are washed from the surface by water flowing over it or passing into the soil. Fresh rain water contains a small quantity of ammonia and carbonic acid, on account of which it has a more wholesome effect upon plants than that derived from wells and springs. A great variety of circumstances affect the quantity of rainfall in different localities, such as nearness to the sea, exposure to prevailing winds, latitude, altitude, and the presence of mountain ranges. Rainfall is affected by the presence of vegetation, since an abundance of vegetable forms tends to aid condensation by keeping the soil cool, while a desert region becomes highly heated and directly counteracts condensation. More rain falls in the tropics than in the temperate regions, and more descends in the temperate than in the polar regions. This is due to a decrease in the quantity of heat and evaporation with moderate regularity from the Equator toward the poles.

The distribution of rain determines in a large measure the material industries of the people, since without moisture any region is a mere desert and the subsistence of animal and vegetable life is either entirely impossible or greatly limited. The supply of rain in the vast interior of North America depends upon the winds blowing from the Gulf of Mexico. These winds are influenced in a measure by the elevated ranges of the Sierra Madre Mountains, in Central America and Mexico, and thus are directed to spread themselves over the great basin of the Mississippi River. The movement of these winds may be traced from the equatorial regions to the vicinity of the peninsula of Yucatan, and as they proceed toward the north and west

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they appear to be elevated by a countercurrent of colder winds near the surface. In moving from the lower to the higher latitudes they gradually give off their store of moisture. The quantity required in the upper part of the valley is perceptibly less than in the southern part, since the temperature is noticeably lower; thus the valley is adequately watered from the Gulf of Mexico to the regions extending far into Canada.

RAINBOW

The Atlantic coast plain and the western slope of the Pacific derive an abundance of moisture from the respective oceans, but there is a considerable shortage of rainfall in the Pacific highlands and the slopes of the Rocky Mountains. Among the vast arid regions are the Sahara and Kalahari deserts of Africa; the Arabian, Tarim, and Gobi deserts of Asia; the coast of Peru; and the great interior of Australia. On the other hand, there are regions where rain falls almost daily or periodically with great excess, such as Patagonia, the lake regions of Africa, parts of India, and the northern part of Brazil. The quantity of rain which falls in a given time on any area is determined by means of an instrument called the rain gauge. The following statistics show the average rainfall of various places of interest: Cherrapungee, India, 610 inches; San Luis de Maranhao, Brazil, 280 inches; Paramaribo, Guiana, 229 inches; Havana, Cuba, 91 inches; Sitka, Alaska, 90 inches; western Sweden, 82 inches; southern Germany, 27 inches; the British Islands, 40 inches; Washington, D. C., 38 inches; and San Francisco, Cal., 23 inches. The average rainfall in the United States in the semitropical zone is 39 inches and in the temperate zone, 34 inches. In Canada the rainfall is greatest on the eastern and the western coasts, with a semi-arid region on the eastern slope of the western highlands, where the precipitation ranges from 10 to 21 inches.

RAINBOW, a luminous arch appearing in the clouds opposite the sun, due to the refraction, reflection, and dispersion of light in drops of water falling through the air. The light is thus decomposed into its simple colors, which always appear in the same order; namely, violet, indigo, blue, green, yellow, orange, and red. A perfect rainbow consists of two concentric arches, the inner or brighter being called the primary bow, while the outer or fainter arch is called the secondary bow. In the primary bow red is the outer color and violet the inner, while in the secondary bow the colors are dimmer and arranged in a reverse order, this being due to a double reflection within the drops. Rainbows are seen only when the sun is 40 degrees or less above the horizon, hence they occur both in the morning and in the evening. Only a part of the rainbow is seen, since a portion of it is below the horizon, but an observer standing on the top of a high mountain can see a greater part of it than an observer occupying a lower altitude. The bow is circular in form because the red ray of the primary bow forms an angle of about 42 degrees when it leaves the drop, and the violet forms one of 40 degrees. The occurrence of a broken rainbow is due to only parts of the field being filled with falling rain, or to the sun being obstructed from parts of it. Rainbows forming a complete circle are caused by the rays of the sun falling on the spray rising from a waterfall or cataract, but this phenomenon is of rare occurrence. They are formed occasionally by the light of the moon, called *lunar rainbows*, but these are not so bright as those seen in daytime.

RAIN GAUGE, or Pluviometer, an instrument for measuring the amount of rain which falls on any given surface. The measurement of rainfall has long been regarded important, and various contrivances to secure fairly accurate tests have been devised. The form generally used consists of a cylindrical vessel with a horizontal base, surmounted by a funnel-shaped top into which the rain enters. A glass tube with an attached scale is connected with the lower part of the cylinder. As the water enters the cylinder it rises in the glass tube and it becomes an easy matter to read the quantity of rain fallen in inches by observing the scale. It is necessary to place the rain gauge in a position free from eddies and whirls. The rainwater accumulated may be emptied by means of a stopcock at the bottom. It is quite important to locate the instrument as near the general level of the region to be tested as possible, since rainfall is more abundant near the ground than at some distance in the air. This was verified in a practical test made at Des Moines, Iowa, where it was found that the rainfall near the general level of the region for one year reached 30.2 inches, while at a height of 150 feet above the general level it was only 24.8 inches. Automatic rain gauges now made have a graduated scale for estimating the rainfall collected by the funnel. They indicate the duration of each shower as well as the rate at which the water falls. The fall of snow, in a melted condition, is always included when speaking of the rainfall of a country.

RAINY LAKE, an inland lake of North America, which forms part of the boundary between Minnesota and Ontario. It is situated 160 miles west of Lake Superior. Rainy Lake is about 40 miles long, has an average width of five miles, and is 1,160 feet above sea level. It has numerous small islands and valuable fisheries. Rainy Lake River, a stream about 100 miles in length, carries its surplus water into the Lake of the Woods.

RAISIN (rā'zǐn), the dried fruit prepared from the grape and used for dessert or in cookery. The species of grapes containing a large quantity of sugar are of greatest value in making raisins. Several methods of producing raisins are in use, those of inferior quality being

dried in an oven. The best grades are made from choice grapes by cutting half through the fruit stalk without detaching it from the tree, thus leaving the cluster to shrink and dry by the heat of the sun while on the vine. Another method is to dip each bunch of grapes into a solution of lye made of the ashes of the burned tendrils, after which the fruit is dried by exposure to the sun. Large quantities of raisins are produced in California, but the principal producing countries are Spain, Asia Minor, Egypt, and other regions adjacent to the Mediterranean Sea.

RAISIN RIVER, Battle of the, an engagement at Frenchtown (now Monroe), Mich., in the French and Indian War. General Harrison had sent a detachment of Americans under General Winchester to take possession of Frenchtown, where he was surprised on Jan. 22, 1813, by a force of British and English under General Proctor. The Americans were defeated, but received assurances from the British that those left in the village would be protected from the Indians. After the British departed with their prisoners for Malden, the Indians massacred nearly 400 and took the balance away into captivity. After that event the Americans frequently used the cry, "Remember the Raisin River."

RAJAH (rä'jä), or Raja, a title borne originally only by the princess of the Hindu race, but now conferred by the British government upon Hindus of rank. Anciently the title was borne only by the military caste and powerful princes, but it is now assumed by landholders and members of inferior castes.

RAJPUTANA (räj-poo-tä'nŭ), an extensive division of British India. It is bounded on the north by the Punjab, east by Agra and Oudh, southeast by the Central India Agency, and west by Bombay. The area is 127,541 square miles. A large majority of the inhabitants are Hindus, but they are divided considerably in religious affiliations, including Brahmins, Mohammedans, Jains, and a small number of Christians. Population, 1916, 9,828,103.

RAKE, an implement with teeth or tines, which is used for collecting loose material or smoothing and evening a surface. The hand implements with parallel teeth fixed at right angles to a long handle are the simplest form of rakes. The horse rakes now used by farmers are two-wheeled implements. They are drawn by one or two horses and are provided with curved tines between the wheels for gathering hay into windrows and cocks.

RALEIGH (ra'li), the capital of North Carolina, county seat of Wake County, near the Neuse River, 147 miles northwest of Wilmington. Communication is furnished by the Southern and the Seaboard Air Line railroads. It occupies an elevated site in the upper valley of the Neuse, about 320 feet above sea level, and is surrounded by a fertile region. Near the center

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of the city, in a small but well-kept square, is the State Capitol. Other noteworthy buildings include the county courthouse, the Federal post office, the State penitentiary, the State Geological Museum, the State Insane Asylum, the State College of Agriculture and Mechanic Arts, and the Governor's mansion. It has many fine libraries, including the State Library of 40,000 volumes. Pullen Park and the Confederate and National cemeteries are fine public grounds. Among the institutions of higher learning are the Saint Mary's School, the Peace Institute, the Raleigh Male Academy, the Shaw University, the Saint Augustine Collegiate Institute, and the Latta University. Raleigh is important as a market in cotton, tobacco, and general merchandise. It has manufactures of cigars and pipe tobacco, cotton-seed oil, clothing, machinery, marbleware, carriages, wagons, furniture, flour, railroad cars, and hosiery. The streets are well graded and improved with drainage and pavements. Raleigh was chosen as a site for the State Capitol in 1792 and was incorporated two years later. In 1865 the city was occupied by

General Sherman. Population, 1910, 19,218. RALEIGH, Sir Walter, navigator and statesman, born in Devonshire, England, in 1552; executed Oct. 29, 1618. He descended



SIR WALTER RALEIGH.

from an ancient English family, entered Oxford University in 1566, but in 1569 left that institution without graduating to aid the French Protestants under Coligny. Later he joined a military force sent by Queen Elizabeth to aid the patriots in the Netherlands in their

struggle against Spain, and in 1580 attained eminence by aiding to suppress a rebellion in Ireland. Raleigh was a man of handsome figure, with a tall form, lofty forehead, and dark hair, and his imposing personality made him quite a favorite at the court of Elizabeth. He formed a scheme to colonize America in 1579 and was granted a charter for that purpose, in which enterprise he was assisted by his halfbrother, Sir Humphrey Gilbert. His expedition was at first apparently successful in privateering against the Spanish, but his efforts to found permanent colonies in Virginia were made unsuccessful by Spanish encroachments. A large share of the forfeited estates of Ireland was granted to him in 1584. Soon after he introduced the culture of the potato in Ireland and was granted special trade privileges to strengthen his colonization scheme in America. He was knighted in 1585, and became captain of the queen's guard in 1587.

Raleigh, in 1588, rendered services against the Spanish armada and subsequently equipped vessels to drive the Spanish forces from strategic points. He privately married Elizabeth Throckmorton, a maid of honor of the queen, in 1593, and thereby incurred the temporary displeasure of her majesty. While banished from court, he headed an expedition to Guiana, where he hoped to discover the fabled El Dorado, a supposed region of gold and gems, for which he embarked in 1595. This expedition resulted in nothing more than taking possession of the country in the name of Elizabeth, and on returning he published an account of the journey. Elizabeth reinstated him to royal favor shortly after his return, and gave him a naval command in 1596, under the Earl of Essex and Lord Howard, who sailed to destroy the Spanish fleet and capture Cadiz. The enterprise terminated in success largely on account of efforts put forth by Raleigh. He further served the queen by capturing Fayal, in the Azores, in 1597, and became Governor of Jersey in 1600, but his brilliant career ended with the death of Elizabeth in 1603.

James I. had well-established prejudices against Raleigh and immediately deprived him of every official position. He was accused of being implicated with Lord Cobham in a treasonable plot to secure the throne for Arabella Stuart, and, after a trial at Winchester, was found guilty and sentenced to be executed. This sentence was afterward commuted to life imprisonment in the Tower. He was confined there for twelve years and spent his time in literary and scientific research. His release was secured in 1616 by proposing to lead an expedition to the Orinoco River for the purpose of developing a vast gold field that he thought could be found. The enterprise not only proved disastrous, but brought on trouble by Raleigh's men attacking and destroying a Spanish village. He was arrested on returning to England, and was executed on the former sentence that still remained in force. Raleigh was a man of lofty moral impulse and noble presence. He possessed a spirit of rare wit, but had proud and impatient traits that were largely instrumental in bringing about his ruin. While in the Tower he wrote his "History of the World."

RAM, an ironclad ship of war having its bow especially designed and constructed for ramming. Such a vessel has a heavily armored stem at the bow below the line of water and is intended to destroy the enemy's ships by driving against them with great force, the collision being designed to crush the side of the attacked vessel without injuring the ironclad. Vessels of this class were first employed in the Civil War, when the Confederate ram Virginia sunk the Federal frigate Cumberland at Hampton

Roads in 1862. The ram is now regarded one of the most efficient vessels for coast defense.

RÅMA (rä'mä), in Hindu legends, the hero of the Rāmāyana, who made his appearance in the world at the end of the Treta Yuga or second age, and is called the seventh incarnation of Vishnu. He is generally spoken of as Ramachandra. Two other incarnations of Vishnu bear the name of Rāma, known as Balarāma and Parasa-rāma.

RAMADAN (răm-à-dăn'), the ninth month of the Mohammedan year, the one in which Mohammed received his first revelation. It is for this reason the great annual fast month and festivities are kept up throughout the entire period, from sunrise to sunset. All believers are enjoined to abstain from eating, drinking, and sensual pleasures during the entire day, but food may be taken at night to supply the necessary wants of the body. The obligations enjoined upon believers during Ramadan are treated in the second book of the Koran called The Cow. Since the Mohammedan months are reckoned by lunar time, each month begins in each successive year eleven days earlier than in the preceding, hence it occurs successively in all the seasons in a period of 33 years.

RĀMĀYANA. (rā-mā'yā-nā), one of the two great epic poems of India, the other being known as Mahábhárata. This poem is the accredited work of Valmiki and recounts the famous exploits of Rama, King of Oude, who was one of the conquerors of Ceylon. It consists of 2,400 stanzas, arranged in seven books, and is thought to have been composed in the 5th century A. D. Many translations and criticisms on this work are extant, since it may be classed as the most celebrated poem in India. The translations of Schlegel are especially noteworthy.

RAMÉE (rå-må'), Louise de la, novelist, born at Bury Saint Edmunds, England, in 1840; died Jan. 25, 1908. In 1860 she settled in London and began to contribute to periodicals under the pen name of Ouida, by which she became known extensively. Her first novel was published in 1863 under the title "Held in Bondage," which was soon followed by a number of other productions, many of which have been dramatized. She traveled extensively in Europe and resided for some time near Florence, Italy. Among Flags," "Two Offenders," "A Dog of Flan-"Critical Studies," and "Village Commune."

RAMESES. "The Maremma," "Views and Opinions," RAMESES."

RAMESES (răm'ė-sēs), the name of several kings of Egypt, who are supposed to have reigned about the time the Children of Israel was the first sovereign of the nineteenth dyname appears on the monuments of Thebes. Rameses II. was the grandson of the preceding and is classed as the third king of the nineteenth

teenth dynasty. His birth is assigned to the 14th century B. c. The inscriptions on various tombs and monuments give him a place as .a patron of art and science and a builder of many vast improvements. It was during his reign that the Israelites became sorely oppressed, and under his son, Rameses III., who is generally known by his title, Pharaoh, the exodus of the Hebrews took place. The latter monarch belonged to the twentieth dynasty. Writers generally agree that the mummies of Rameses I. and Rameses II. were found in a pit near Thebes in 1881, and that the mummy of Rameses III. was discovered among papyri and other relics in 1886.

RAMESSEUM, the name of a temple built at Thebes, Egypt, by Rameses II. It was located on the west bank of the Nile, where its ruins attract many tourists. This temple was dedicated to the god Ammon and contained a colossal statue of Rameses II.

RAMIE. See Boehmeria.

RAMILLIES (rå-mè-yē'), or Ramilies, a town of Belgium in Brabant, 28 miles southeast of Brussels. It is noted as the seat of an important battle in the War of the Spanish Succession, which occurred on May 23, 1706. The French forces were commanded by Marshal Villeroy and the elector of Bavaria, while the allied troops were under the command of Marlborough. The former were defeated with a loss of 13,000 men and France was compelled to abandon its claim to the Spanish Netherlands.

abandon its claim to the Spanish Netherlands. RAMPART (răm'pärt), the embankment surrounding a fort, on which the parapet is raised, and which is designed with the view of resisting cannon shot. It is constructed immediately within a ditch, the lower part of the outer slope being usually made of solid masonry and the remainder being formed by the earth taken from the ditch. The height of the rampart is determined largely by the height of the buildings to be defended and by the character of the region surrounding the fort.

RAMSEY (răm'zĭ), Alexander, statesman, born near Harrisburg, Pa., Sept. 8, 1815; died April 22, 1903. He graduated from Lafayette College and soon afterward engaged in a political career. In 1841 he was made clerk of the Pennsylvania house of representatives and was elected to Congress in 1842 as a Whig, serving four years. He became the first territorial governor of Minnesota, holding that office until 1853. Two years later he was elected mayor of Saint Paul and served as Governor of the State from 1860 to 1863. In the latter year he was elected to the United States Senate, where he served with marked success for twelve years. In 1879 he became Secretary of War under President Hayes and was a member of the Utah Commission in 1882.

RAMSEY, David, soldier and historian, born in Lancaster County, Pennsylvania, April 2, 1749; died May 8, 1815. He graduated from

Princeton College, took a course in medicine, and established a successful practice at Charleston, S. C. His principal writings include "History of the American Revolution," "Life of Washington," and "History of South Carolina."

RAMSEY, Sir William, scientist, born at Glasgow, Scotland, Oct. 2, 1852; died July 23, 1916. He studied in his native city and at Tübingen. In 1872 he was made assistant chemist at Glasgow, after which he held professorships in chemistry at Bristol and London. He discovered the element argon and first showed the changes that take place in radium when it is exposed to the helium of the sun. He published numerous books on the gases of the atmosphere and on inorganic chemistry.

RANC (ran), Arthur, author and statesman, born in Poitiers, France, in 1831. He studied in Paris, was admitted to the bar, and on account of opposing the empire was obliged to leave France. The amnesty of 1859 permitted him to return to Paris, but he was imprisoned for publishing articles unfavorable to the government in the Opinion Nationale. Gambetta made him director of police in 1870 and the next year he was elected to the National Assembly, but resigned soon after on account of being opposed to making peace with Germany and joined the commune. He published République Française and was obliged to leave France a second time, owing to his radical support of communism, but returned after the amnesty of 1879.

RANCH, a term applied in the western part of North America to an establishment for rearing and grazing cattle and other stock in large numbers. The name was derived from the Spanish word rancho, meaning a hut or collection of huts in which ranchmen mess and lodge. Ranching has long been an important business and involves the rearing of large herds of cattle, horses, ponies, and sheep. For nearly half a century the ranchmen and cowboys had almost uninterrupted possession of many sections of the great plains, but the region is now penetrated more or less by railroads and limited by agriculturists.

RANDALL (răn'dal), Samuel Jackson, statesman, born in Philadelphia, Pa., Oct. 10, 1828; died in Washington, D. C., April 12, 1890. He first engaged in a mercantile business in Philadelphia, became State Senator in 1858, and served two years in the Union army, attaining to the rank of captain. In 1862 he was elected to Congress as a Democrat, but served again in the army in the Gettysburg campaign. His Congressional service included a period of 28 years and he was speaker of the House from 1876 to 1881. Randall was prominent as a leader of the protectionist wing of the Democratic party, opposed the Force Bill in 1875, and served on a number of important committees. He was held in high esteem by his constituents and congressmen for his eminent ability and devotion to legislative duties.

RANDOLPH (răn'dŏlf), Edmund Jennings, soldier and statesman, born in Williamsburg, Va., Aug. 10, 1753; died in Frederick County, Virginia, Sept. 12, 1813. He was the son of John Randolph, a royalist, who disinherited him because he sided with the Americans and joined Washington's army. After taking a law course, he was admitted to the Virginia bar. He was a member of the Virginia constitutional convention in 1776, and in the same year succeeded his father as attorney-general. He was a delegate to Congress from 1781 to 1782, Governor of Virginia from 1786 to 1788, and in 1789 became Attorney-General of the United States. President Washington appointed him Secretary of State in 1794 to succeed Jefferson, but he resigned the following year on account of a misunderstanding in relation to the Jay Treaty. Subsequently he practiced law in Richmond, Va., and served as a counsel on the trial of Aaron Burr for treason. He published a history of Virginia.

RANDOLPH, John, statesman, born in Cawsons, Va., June 2, 1773; died in Philadelphia, June 24, 1833. He descended from a wealthy family of Virginia, was a second cousin of Edmund J. Randolph, and traced his ancestry to Pocahontas, the famous Indian princess. His education was secured at Princeton and Columbia colleges. He was elected to Congress as a Democrat in 1799, of which body he remained a member, with the exception of two terms, until 1825, and served as United States Senator for two years, from 1825 to 1827. Randolph was a strict constructionist and was renowned for eloquent satire. His influence as a speaker was enhanced by his wit and eccentricity. He opposed Madison and the War of 1812, and was led into a duel with Clay by styling the union of Adams and Clay a "coalition between the blackleg and the Puritan." His opposition to the War of 1812 caused his defeat for Congress. Randolph attracted more attention than any statesman of his time on account of his decided views in favor of State rights, opposition to alleged usurpation of power at Washington, and the readiness and effect of his oratory. President Jackson appointed him minister to Russia in 1830 and he was elected to Congress in 1832, but died of consumption before taking his seat. Randolph provided in his lifetime for the liberation of his slaves, about 300.

RANDOLPH, Peyton, statesman, born in Williamsburg, Va., in 1723; died in Philadelphia, Pa., Oct. 22, 1775. He graduated from William and Mary College, studied law in London, and in 1748 was given an appointment by the King as Attorney-General of Virginia. In 1765 he prepared the remonstrance passed by the House of Burgesses against the passage of the Stamp Act, and soon after became a member of the House of Burgesses, of which he was

chosen speaker. He was President of the First Continental Congress that assembled in Philadelphia on Sept. 5, 1774, and also when that body reassembled on May 10, 1775, but died of

apoplexy the following October.

RANGOON (ran-goon'), the capital and chief seaport of British Burmah, on the Rangoon River, twenty miles from the sea. Rangoon River is the eastern branch of the Irrawaddy, and the city is situated along the left bank, its dock being on the opposite side of the river, at the suburb of Da-la. Rangoon is an important railroad and trade center. It is fortified and garrisoned and contains many valuable public buildings. The most noteworthy structures include the government buildings, the Saint John's College, a number of hospitals and schools, and numerous churches, mosques, and temples. A large majority of the people are Burmese, but it has a considerable number of Hindu inhabitants. A city has existed here since many centuries before the Christian era, but its prosperity dates from the 18th century, when it was captured and rebuilt by the Burmese. The British came in possession of it in 1852. It is the seat of rice mills and has manufactures of clothing, lumber products, pottery, and utensils. The trade in timber, ivory, rice, hides, cotton, precious stones, and gums is

important. Population, 1906, 236,818.

RANJIT SINGH (rŭn-jēt' sĭng'h'), noted military leader of the Punjab in India, born Nov. 2, 1780; died June 27, 1839. He was the son of a Singh chief, who died in 1786, and the son received an adequate training in military tactics. His capacity as a military and political ruler induced the Shah of Afghanistan to intrust him with the government of the province of Lahore. It soon became his ambition to unite all the Singh provinces into one dominion, which he did after a decade of earnest and enduring perseverance, thus founding the Singh kingdom. His army of 75,000 men was defeated by the Afghans in 1836, but he still continued absolute sovereign over the territory he had acquired. His reign was one of moderation and stands as a signal success in Asiatic history, being particularly remarkable for the reason that he lacked even the elements of an education.

RANK. See Relative Rank.

RANKE (rän'ke), Leopold von, eminent historian, born in Wiehe, Germany, Dec. 21, 1795; died in Berlin, Sept. 23, 1886. He studied at Halle, Berlin, and Leipsic, and in 1818 became a tutor in the Frankfort gymnasium. In 1825 he was appointed professor of history in the University of Berlin, a position given him because of his first great historical work, the "History of Latin and Teutonic Nations." Ranke continued to lecture at Berlin until his death. His life was one of remarkable activity, producing not only a large number of works, but many historical productions of value and wide pop-

ularity. His "Prussian History" is a work of twelve volumes that appeared in 1847, and his "History of the Popes of Rome," a voluminous work, has been translated into the language of nearly every civilized people. His last great work is his "History of the World," in twelve volumes, which he completed at the age of eighty years. Ranke was highly honored by the government. He was granted a title of nobility in 1865, became privy councilor in 1882, and his ninetieth birthday, in 1885, was made a national holiday, on which Emperor William called at his residence and personally congratulated him. Among his writings not mentioned above are "History of Germany in the Time of the Reformation," "Princes and People of Southern Europe in the Sixteenth and Seventeenth Centuries," "Servian Revolution," and "History of France in the 16th and 17th Centuries."

RANKIN, Jeannette, public woman, born near Missoula, Mont., in 1882. She graduated at the University of Montana, where she became an instructor in economics, and afterward studied at Seattle, in the University of Washington. Subsequently she traveled extensively, visiting Europe and Australasia, and gave much time to research work in social and economic conditions. In 1914 she conducted a successful campaign for woman suffrage in her State, where the movement for political equality carried, and in 1916 was elected the first woman member of Congress. In her official capacity she favored peace, and in 1917 voted against the

war with Germany.

RANSOM (răn'sŭm), Mathew Whitaker, soldier and statesman, born in Warren County, North Carolina, Oct. 8, 1826; died Oct. 8, 1904. He studied at the University of North Carolina, where he graduated in 1847, and the same year was admitted to the bar. In the Seven Days' Battle he showed great bravery, was wounded at Malvern Hill, and commanded a brigade at Antietam. Soon after he was promoted brigadier general and during the Gettysburg campaign took an efficient part, and in 1864 commanded at the recapture of Plymouth, N. C. General Lee complimented him for efficient service at Hare's Hill in 1865, and he remained active until the surrender at Appomattox Court House. In 1872 he was elected to the United States Senate and served continuously until 1895, when he was made United States minister to Mexico.

RANUNCULUS (rà-nun'kū-lus), a genus of herbaceous plants of the buttercup family, several common species of which are known as buttercup, or crowfoot. The flowers have five or more petals and numerous stamens, and the seeds are grouped into a head or cluster. The leaves of most species are much divided, the roots are bulbous, and some species have acrid and caustic properties. Buttercups are among the more common species and are found largely in meadows, while crowfoots and spearworts are equally well known, the former growing

mostly in pastures and the latter in marshes and wet places. More than a hundred species have been described. A double-flowered variety. known as bachelor's button, is cultivated in some regions as a flowering plant. It has a tall stem

and white or yellow flowers.

RAPE, a biennial plant which is cultivated extensively in Europe, principally for the leaves and the seed. It is closely related to the cabbage family, but it has a root like that of the turnip, this portion being esculent and useful as an article of food. A species known as summer rape is well known in England and France, being cultivated largely for colza oil obtained from the seed. This oil is used for machinery and lamps in lighthouses. The seed is fed to cage birds. Rape is not only valuable as a forage crop and for the root and seed, but is useful to plow under as a fertilizer.

RAPHAEL (răf'ā-čl), or Raffaello, Sanzio, one of the most eminent painters of the world, born in Urbino, Italy, April 6, 1483; died at Rome, April 6, 1520. He was the son of Giovanni Sanzio, a painter, who died in 1494. From him the son received his first instruction, but he was afterward intrusted to the care of an uncle, who placed him in the studio of Perugino at Perugia. He was instructed under this eminent painter for a term of six or eight years. He went to Florence in 1504, where he painted until 1508, and then was invited to Rome by Pope Julius II. His paintings were at first influenced to some extent by the manner of Perugino, but at Florence he began to develop a new and independent style of artistic work by studying the productions of the great mas-

It may be said that Raphael acquired simplicity and strength of outline from Michael Angelo, a depth of coloring from Fra Bartolemmeo, and grace of expression from Leonardo da Vinci. His Florentine productions include "Christ Bearing the Cross," "Madonna," "Holy Family," and "The Marriage of Joseph and the Virgin." After reaching Rome, he was engaged to assist Bramante in embellishing the Vatican, in which he executed many famous frescoes. These include "Dispute of the Fathers of the Church" and "School of Athens," both in the second chamber. Other frescoes in the Vatican are "The Fall of Adam," "Solomon's Judgment,"
"Temperance," "Astronomy," "Emperor Justinian Delivering the Roman Law to Tribonian," "Gregory X. Giving the Decretals to an Advocate," "Leo the Great Stopping the Progress of Attila," "Moses Viewing the Burning Bush," "Deliverance of Peter from Prison," "Building of the Ark" and "Jacob's Dream."

Raphael's works are generally grouped in three classes, including those executed in the manner influenced by Perugino, those produced under his Florentine style from 1504 to 1508, and those executed after settling in Rome.

Transition to the latter style is first recognized in his "Dispute of the Fathers of the Church." Though each style has its peculiar merit, it may be said that his last manner exhibits the most classical features, since it was influenced largely by his contact with numerous productions of the classical period. The last famous work undertaken by him is his "Transfiguration of Christ," which was left in an unfinished state at his death and may be seen in the Vatican.

RAPIER (rā'pĭ-ēr), a straight sword used only for thrusting. The blade is highly tempered and finely pointed and was formerly used very extensively in duels among military men. At present it is employed in state ceremonials.

RAPPAHANNOCK (răp-pà-hăn'nŭk), a river in Virginia, which has its source in the Blue Ridge Mountains, and, after a course of 225 miles toward the southeast, flows into Chesapeake Bay by an estuary about 70 miles long. It is navigable to Fredericksburg, 110 miles. The principal tributary is the Rapidan. On these two rivers occurred the important battles of Fredericksburg, Chancellorsville, and the Wilderness, in the Civil War.

RARITAN (răr'i-tan), a river of New Jersey, which rises in Morris County and flows southeast into Raritan Bay. It is 70 miles long and is navigable to New Brunswick. The-Delaware and Raritan Canal joins it at that city, connecting it with the Delaware River and forming a short route between New York and Philadelphia.

RASK (räsk), Rasmaus Christian, noted philologist, born near Odense, Denmark, Nov. 22, 1787; died Nov. 14, 1832. He studied at the University of Copenhagen and later made an extended visit to northern Russia, Sweden, and Iceland with a view of making a study of the Scandinavian languages. In 1818 he published "Researches Concerning the Origin of the Icelandic or Ancient Language of the North." Shortly after he secured government aid to travel through Russia, Persia, Arabia and India, and spent some time studying Sanskrit in the last named country. He visited Astrakhan to study the language of the Tartars and made his return journey through Turkey, reaching Copenhagen in 1823. Two years later he became professor of literary history in the University of Copenhagen, and was made teacher of Oriental languages in 1828. His death resulted from his energies becoming exhausted by hard work. Rask is the author of several grammars and numerous works on history and philology, including "Ancient Egyptian Chronology," "Anglo-Saxon Grammar," and "Oldest Hebrew Chronology."

RASPBERRY (răz'běr-ry), a shrubby plant belonging to the same genus as the blackberry. It is cultivated extensively as a garden fruit. The old plants have many suckers, the stem is characterized by slender prickles, and the leaves are pinnate. It is native to America and the

northern part of Europe and Asia. The cultivated species have been greatly improved and about 500 different kinds have been described. They include red, yellow, and black species and the fruit resembles the strawberry in not becoming acid in the stomach. The ripened fruit is used in making jam, jelly, and various liquors and is eaten as a dessert. Different kinds of medical preparations are made of it, including compounds of use in fevers and for expector-



RASPBERRY.

ants. Wild species are found in many sections of the United States. The raspberry is cultivated throughout the southern part of Canada.

RAT, a class of rodent mammals belonging to the mouse family, but including only the larger species. A number of species have been described. They infest houses, barns, and ships. Most rats have a slender head and a long, scaly tail. The Norway or brown rat is about nine inches in length, and is the largest and most powerful. The black rat has a somewhat shorter body, a longer tail, and larger ears. These two kinds are native to Central Asia, where other allied species also prevail. Rats were unknown in Europe until the 16th century, when the black rat made its appearance, and about two centuries later the brown rat became common to the western part of that grand division. Both are now distributed in America and are hostile to each other. The brown rat being stronger, it either kills or drives the black rat from a locality when it once gets a permanent foothold. Rats feed on many kinds of animal and vegetable food, and to obtain it they burrow in the ground or gnaw through wooden structures. They devour eggs, small poultry, birds, grain, and vegetables and make their way into warehouses and dairies. The rat multiplies very rapidly. Its flesh is eaten only by rude tribes and animals, though its skin is used to a considerable extent in making gloves. The white rat belongs to this class of animals and is frequently seen as a household pet. A species known as the cotton rat is common to the southern part of the United States.

RATCHET (răch'ět), a mechanism for holding or propelling a ratchet wheel. It consists of a pawl or click, which fits into the teeth of a circular wheel, as in the carriage of a typewriter, where it turns a wheel by degrees. The windlass and derrick furnish an example of a ratchet that prevents the backward movement of a wheel.

RATEL (rā'tēl), a mammal of the badger family, sometimes called honey badger from its fondness for honey. The size is that of the badger, but it is somewhat heavier and has a less projecting nose. The ratel native to South Africa burrows in the ground for its dwelling and searches for the nests of wild bees, against whose sting it is protected by its loose and leathery hide. The ratel of Asia has a shorter tail, is about three feet in length, and is nocturnal in its habits. It feeds on small animals and insects and is said to prey upon imperfectly buried human bodies.

RATIO (rā'shǐ-ð). See Proportion.

RATIONALISM (răsh'ŭn-al-ĭz'm), a term employed to denote a system of theology in which reason is the supreme guide. It stands in opposition to supernaturalism, which is the doctrine of a supernatural agency in the matters of faith and morals. While rationalism is founded upon physical or natural causes, supernaturalism assigns revelations to a divine agency. As a doctrine rationalism had its rise in Germany at the time of the Reformation, when the Roman Catholic Church held to the doctrine of infallibility as a central dogma. In 1521 Martin Luther declared at the diet of Worms: "Unless I am refuted and convinced by proofs from the Holy Scriptures, I yield my faith neither to the Pope nor to the council alone." In this doctrine Luther was joined by Zwingli and Calvin, and in 1530 was published the Confession of Augsburg. Kant used the term rationalism in considering the tendency which claims for the unaided human reason the right of deciding in matters of faith. In this sense it departs from the teachings of Luther, since it considers all sources of information and leaves to the human reason the important decision of matters of faith, without regard to the authority of councils or the Scriptures.

RATISBON (răt'îs-bŏn). See Regensburg. RATON (ra-tōn'), a city in New Mexico, county seat of Colfax County, twenty miles south of Trinidad, Colo. It is on the Atchison, Topeka and Santa Fé Railroad, and is surrounded by a farming and stock-raising country. In its vicinity are productive deposits of coal. The principal buildings include the county courthouse, the high school, and a number of churches. It has grain elevators, stock yards,

and extensive railway shops. Population, 1900, 3,540; in 1910, 4,539.

RAT PORTAGE, or Kenora, a city of Canada, in the western part of Ontario, 130 miles east of Winnipeg, Manitoba. It is a port of entry on the northern shore of the Lake of the

Woods, has communication by the Canadian Pacific Railway, and is surrounded by a lumbering and gold-mining district. The chief buildings include the high school, the armory, and the Commercial and King Edward hotels. It is noted as a summer resort. Fine water power is furnished by the Winnipeg River, which has a fall of twenty feet. The manufactures include flour, machinery, clothing, and lumber products. It has an extensive trade in merchandise and lumber. Population, 1901, 5,202; in 1911, 6,158.

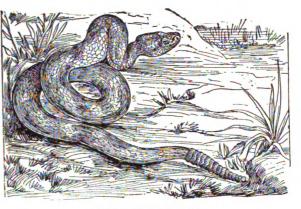
RATTAN (rat-tan'), the name applied commercially to the long and flexible stems of several species of climbing palms and to the more rigid stem of certain erect palms. The former are very tough and strong and are used for many pur-

poses, such as making ropes, seats of chairs, cables, baskets, mats, hats, and various kinds of wickerwork. The stems of the erect palms are used mostly for walking sticks. Rattan is produced largely in Sumatra, Java, and other islands southeast of Asia. It is sold in the export market in bundles of 100 canes, each measuring from fifteen to twenty feet in length.

RATTLESNAKE (răt't'l-snāk), the general name of several species of venomous snakes, so named because of having a series of horny scales at the end of the tail, which clash together with a rattling sound when the tail is vibrated. The rattle is a complicated organ and appears in very young rattlesnakes, before they have shed their skin for the first time. When the skin is renewed a new joint appears next to the body of the snake, while the old one is not cast off with the remainder of the epidermis. Thus, there are as many loose joints in the rattle as there have been renewals of the skin of the snake, though the number does not indicate the age of the snake, since the skin is changed oftener than once a year, but it does indicate the number of changes of skin that the animal has undergone. The rat-tles are dry, horny, and cup-shaped, each fitting over a portion of the preceding and tapering toward the farther end. They give off a peculiar sound when shaken, unless wet by rain or dew, when no sound can be produced.

Rattlesnakes are natives to America, and include about fifteen species. They are sluggish in habit, but pursue squirrels, rabbits, mice, and other animals upon which they prey with considerable skill. The poison is one of the most deadly found in serpents and penetrates rapidly and with deadly effect the nerve centers. The prairie rattlesnake attains a

length of about three feet and is found in many sections of the western states, where it shares burrows in common with prairie dogs and owls. The banded rattlesnake occurs east of the Mississippi and reaches a length of from four to six feet. Other and larger species are



PRAIRIE RATTLESNAKE.

found in Mexico, Central America, and South America.

RAUCH (rouk), Christian Daniel, distinguished sculptor, born at Arolsen, Germany, Jan. 2, 1777; died at Dresden, Dec. 3, 1857. He

studied sculpture at an early age, but at the death of his father, in 1797, went to Berlin. While there he became valet to Emperor Frederick William III., who recommended him to the Academy of Fine Arts. In 1804 he visited Rome, where he became acquainted with Thor-



CHRISTIAN DANIEL RAUCH.

waldsen and Canova and received patronage from William Humboldt, then Prussian minister at Rome. The King of Prussia called him to Berlin in 1811 to execute a monumental statue of Queen Louisa, a work which established his fame. This production is now in the garden of Charlottenburg, at the mausoleum of the queen, and a second statue of the queen by him is in the palace of San Souci, near Potsdam. The latter work occupied his time for eleven years and is regarded among the famous masterpieces of sculpture. Other noted productions include statues of Schiller, Goethe, Schleiermacher, Dürer, Maximilian of Bavaria, and Field Marshal Blücher. The magnificent monument of Frederick the Great in Berlin is his greatest work, which was completed after

twenty years of labor, and was dedicated with great pomp in 1851. Rauch was a tireless laborer and is the designer and executor of many ideal busts in marble, several of which are of colossal size.

RAUHES HAUS (rou'es hous), meaning rough house, an institution founded near Hamburg, Germany, by Johann Heinrich Wichern. It is located at a suburb named Horn and is managed as an adjunct to the German Home Mission. This institution was opened in 1831, and has since grown into an important insti-tution for the culture of children—physically, intellectually, and morally. An artisan is appointed for the supervision of families of children, usually about twelve, and they are instructed in different elementary branches of study and are trained to do all classes of useful household and outdoor labor. The institution somewhat resembles an industrial school, with the addition of special efforts to inculcate moral tendencies and ability for various occupations, such as teaching, superintendence, clerking, etc.

RAVEN (rā'v'n), a species of crow, widely distributed and remarkable for its large size. It is about two feet from the bill to the tail, and its extended wings measure nearly three feet. The plumage is glossy black. Its bill is thick and short, the tail is rounded, and its flight extends high into the air. Ravens are able to scent carrion a distance of several miles, which causes them to congregate in the vicinity of dead animals, their favorite food, but they also feed on fruits and tender shoots of plants. They are noted for being long-lived and may be taught to imitate human speech. The ravens are noted in literature, being the first birds to be mentioned in the Old Testament, and they are alluded to in classic mythology as an ill omen. Shakespeare mentions the appearance of the raven as foreboding misfortune, while Poe makes it a prominent figure in "The Raven."

RAVENNA (rà-věn'nà), a city of Italy, capital of a province of the same name, four miles west of the Adriatic Sea and 42 miles southeast of Bologna. It is located in a fertile region, has wide streets, and is surrounded by walls. In former times the sea extended to the city, but now its harbor is silted up, and the connection with the Adriatic is by a canal. A railroad line connects it with the great railroad system of northern Italy, giving it convenient trade facilities. Among the manufactures are silk textiles, pottery, utensils, clothing, musical instruments, and machinery. Its streets are adorned with a number of statues of the popes and the city is generally rich in monuments of art. The principal buildings include a cathedral dating from the 4th century, numerous other churches, and a library containing 100,000 volumes. It has numerous educational institutions, museums, gardens, and parks. Among the municipal facilities are electric lights, waterworks, pavements, and telephones. Ravenna is a very ancient city, and is thought to have been founded by the Umbrians. Emperor Honorius made it the capital of the Roman Empire, but its greatest prosperity was attained under Theodoric the Ostrogoth, who was buried here. It became the metropolis of the Longobardic kingdom in 1752, but the Lombards were expelled by Pepin and Charlemange, who presented it to the Pope. It continued as an exarchate to the Pope until 1860. Population, 1916, 64,031.

RAWLINS (ra'linz), a city of Wyoming county seat of Carbon County, 135 miles west by north of Laramie. It is on the Union Pacific Railroad and is surrounded by a mining and sheep-raising country. The features include railroad machine shops, the county courthouse, the high school and the State prison. It has electric lighting, public waterworks, and a large commercial trade. Limestone and building stone are quarried in the vicinity. Population, 1905, 3,617; in 1910, 4,256.

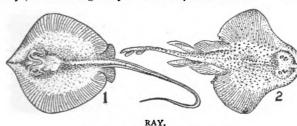
RAWLINS, John Aaron, soldier, born in East Galena, Ill., Feb. 13, 1831; died in Washington, D. C., Sept. 9, 1869. He attended public school and engaged as a charcoal burner, but later studied law. In 1854 he became a member of the Illinois bar and established a successful practice at Galena. He was elected city attorney in 1857, supported Douglas for the presidency, and opposed armed liberation of the slaves. However, at the beginning of the Civil War he gave hearty support to the administration, and became aid-de-camp to General Grant. He accompanied that military leader in practically all the campaigns and battles from Cairo to Lee's surrender, entering the service with the rank of captain and attaining that of major general. President Grant selected him as Secretary of War in 1869, a position he held until his death.

RAWLINSON (ra'lin-sun), George, historian, born at Chadlington, England, Nov. 23, 1812; died Oct. 6, 1902. He attended the Swansea and Ealing School, graduated at Trinity College, Oxford, in 1838, and in 1840 was made fellow in Exeter College. In 1861 he was elected Camden professor of ancient history at Oxford University, and was appointed canon of Canterbury Cathedral in 1872. From 1888 until his death he was rector of All Hallows' Church, London. In connection with his brother, Sir Henry C. Rawlinson, he published a valuable work entitled "History of Herodotus." His works include "Manual of Ancient History," "History of An-"Story of Parthia," "History of cient Egypt," "Story of Parthia," "History of Phoenicia," "Five Great Monarchies of the Ancient World," "Seventh Oriental Monarchy," "Historical Illustrations of the Old Testament," and "The Origin of Nations." In 1859 he was Bampton lecturer, and the following year his lectures were published under the title of "Historic Evidence of the Truth of Christian Records."

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RAWLINSON, Sir Henry Creswicke, soldier and diplomat, born in Chadlington, England, April 11, 1810; died in London, March 5, 1895. He was educated at Ealing, Middlesex, and in 1826 entered the military service in India, serving in the Bombay presidency until 1833. In the latter year he reorganized the Persian army and served in Afghanistan from 1840 to 1843. He was consul at Bagdad in 1850 and became consul general for Turkey in 1851. He was made director of the East India Company in 1856 and soon after returned to India, whence he was sent in 1859 as special envoy to the Shah of Persia. Rawlinson made a special study of cuneiform inscriptions in Persia and other Oriental countries, and in 1871 became president of the Royal Geographical Society. He joined his brother, George Rawlinson, in making a translation of Herodotus, and aided George Smith in publishing "Cuneiform Inscriptions of Western Asia." He sat as a Liberal in Parliament for a number of years, received a baronetcy in 1891, and contributed a number of articles on geography to magazines and encyclopedias. His principal work is a publication of Eastern political affairs, entitled "England and Russia in the East.'

RAY, a genus of cartilaginous fishes. They are generally divided into numerous families, including the sawfishes, electric rays, skates, sting rays, and the eagle rays. The sawfishes have an



1, Florida Sting Ray; 2, Common Skate.

elongated body and a peculiar prolongation of the snout, armed with from three to five cartilaginous tubes. This snout prolongation is called the saw, and is a formidable weapon of defense, with which it is able to tear open the body of its prey to feed on the vitals. The electric ray has peculiar organs by which it is capable of generating electricity as a means of defense, or to kill the smaller animals on which it feeds. Its body is smooth and naked. The skate, or thornback ray, is so named from the peculiar curved spines, while the sting rays are peculiar for their vertical fins and barbed spine, with which they are able to inflict painful wounds. In the cagle rays the pectoral fins are highly developed, the body is dilated, and the tail is very thin. More than a hundred species of rays have been described. Some weigh only a few ounces, while others attain a weight of 1,500 pounds. Many species of the genus are distributed more or less widely in all the seas.

RAYMOND (rā'mund), Henry Jarvis, journalist, born in Lima, N. Y., Jan. 24, 1820; died in New York City, June 18, 1869. In 1840 he graduated from the University of Vermont and was shortly after selected by Horace Greeley as assistant editor of the New York Tribune. He became editor of the Courier and Enquirer in 1843 and in 1851 founded the New York Times, one of the leading journals of the United States. He became a member of the New York Legislature in 1849, was made speaker in 1850, and became Lieutenant Governor of the State in 1854. In 1864 he was elected to Congress as a Republican, but declined reëlection two years later to devote himself to journalism. His death resulted from an attack of apoplexy. He wrote "Life and Public Services of Abraham Lincoln" and "Life of Daniel Webster."

RAZOR (rā'zēr), a knife of a peculiar shape and with a keen edge, used to shave the hair from the face or the head. The best quality of steel is used in making razors and the sides of the blades are usually drawn or ground concave. The blade is held to the handle by a rivet, which facilitates turning it in a position most convenient for shaving. Razors of this kind are used exclusively by barbers, while safety razors, which are fitted with a guard to prevent cutting the face or head, are employed in personal shav-

ng.

RE (rā), the name of the ancient sun god of the Egyptians. He is credited with overcoming the powers of darkness and is said to have turned chaos into order and system. In old age he was overcome by the goddess Isis. He was supposed to be the ancestor of the Pharaohs, who assumed the title of Son of Re.

RÉ (rå), an island of France, in the Bay of Biscay, belonging to the department of Charente Inférieure. It is seventeen miles long and four miles wide.

Oysters, wine, and salt are the principal products. The island is located opposite La Rochelle and is strongly fortified. Population, 1916, 14,534.

READ, Opie Percival, author, born in Nashville, Tenn., Dec. 22, 1852. He was educated at Neophogen College, Gallatin, and after graduating took up journalistic work at Little Rock, where he afterward founded The Arkansaw Traveler, a weekly publication devoted to literature and humor. Later he removed to Chicago and engaged largely in literary work. He became highly popular as a platform and Chautauquan lecturer. Among his best known writings are "Len Gansett," "A Tennessee Judge," "A Kentucky Colonel," "Emmett Bonlore," "Wives of the Prophet," "The Jucklins," "Opie Read in Arkansas," "The Carpetbagger," "Twenty Good Stories," and "Our Josephine and Other Tales."

READ, Thomas Buchanan, poet and painter, born in Chester County, Pennsylvania, March

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12, 1822; died in New York City, May 11, 1872. He studied the elements of sculpture and painting in Cincinnati, Ohio, and spent several years in traveling through various states, supporting himself by sign painting and occasionally working as a cigar maker. In 1846 he opened an art studio in Philadelphia, but went to Italy in 1850, visiting Florence. Later he established his permanent residence at Rome, though he continued to make occasional visits to the United States. He spent considerable time painting scenes from personal observations in the Civil War and at that time wrote his best known single poem, entitled "Sheridan's Ride." Other productions include "Female Poets of America," "House by the Sea," and "Wagoner of the Alleghanies. "House by His principal paintings embrace "Sheridan and His Horse," an illustrative work of the above mentioned poem, "Spirit of the Waterfall," and

"Lost Pleiad.

READE (rēd), Charles, eminent novelist, born at Ipsden House, in Oxford, England, June 8, 1814; died April 11, 1884. He graduated from Oxford in 1835, studied law, and was called to the bar of Lincoln's Inn in 1843. However, his inclination turned toward literature, but he did not publish any productions until 1850, when his story of "Peg Woffington" appeared. This work was afterward dramatized by him in conjunction with Tom Taylor and became known as "Masks and Faces." The writings of Reade are full of energy and bear marks of strong moral purpose, though in some the style is rugged and often crude. It was his purpose to recount many of the abuses in the prison system of England. the mismanagement of its hospitals, and the oppression practiced by trades unions. Incidents in relation to these matters were interwoven with imaginary narratives, and the whole was given a dramatic form easily adaptable to the uses of the stage. Among his best known works are "It Is Never Too Late to Mend," "Griffith Gaunt," "A Terrible Temptation," "The Course of Love," "Christie Johnstone," and "The Cloister and the Hearth."

READE, John, journalist and author, born in Ballyshannon, Ireland, Nov. 13, 1837. He was educated at Queen's College, Belfast, and removed to Canada in 1856. Soon after he founded the Montreal Literary Magazine. He became a minister of the Anglican Church in 1854, but continued to give much attention to literary work. Several distinguished honors were bestowed upon him, including fellowship in the Royal Society of Great Britain. books include "The Making of Canada," "The Prophecy of Merlin and Other Poems," and "Literary Faculty of the Native Races of America."

READING, the art of perusing written or printed matter to ascertain and consider its contents or meaning. The subject as a whole is divided into oral and silent reading. Oral reading is closely associated with elocution, as it involves giving proper oral expression to thought and sentiment, though the latter term has particular reference to the higher department of reading. Silent reading is the art of practice of reading to one's self, or the art of perusing written or printed matter without uttering aloud the words. It is merely seeing the thoughts through the words. Skill in both oral and silent reading is made an objective point in studying the subject, but it may be said that silent reading is the more important of the two, since the larger part of our study is from printed pages with the view of getting thought and meaning. However, oral reading is a fire art, and skill in it should be regarded a valuable accomplishment. Many of the noted actors and public readers have been as highly honored as the eminent musicians; it is difficult to say whether the higher praise is due to Charlott-Saunders Cushman (q. v.) or Jenny Lind.

While the subject of reading is of interest to all, it has special elements of importance to teachers of children and youth. A comparatively small proportion of teachers in the common schools have been as well equipped to teach reading as its importance demands, but there is a notable improvement in ability to instruct as well as in the methods employed, especially in the states where an adequate number of normal schools and institutes have been provided for The lack of the equipment of teachers. thoroughness in reading may be attributed at least partially to the circumstance that many educators have looked upon it as secondary to grammar, mathematics, and other sciences. However, it is to be noted that many academies and schools of higher learning are employing special teachers of reading and elocution. On the other hand, public schools are becoming equipped with professionally trained teachers in the primary branches, who are cultivating a taste for reading and laying a foundation for wholesome advancement in both thought gathering and expression.

Much has been said and written on the art of teaching reading. Many plans of instruction have been proposed, among them the so-called alphabet, word, object, phonetic, synthetic, and sentence methods. The alphabet method was formerly in general use. By it the pupil is taught the letters of the alphabet before an effort is made to teach reading. It differs from the word method, in that by the latter the children are taught to recognize words as wholes rather than to learn them by noticing the individual letters of which they are composed. The object method is quite similar in many respects to the word method, but differs from it in that the attention of the learner is directed to objects instead of names. Usually pictures as well as objects are used in conversational lessons. Both the phonetic and synthetic methods consist chiefly in teaching the elementary sounds of the language, but in the latter greater stress is laid upon the importance of articulating the particular sounds and using them in building words. This is done by the learner uttering them as distinct sounds, by repeating in concert, and by singing them according to a scale or in verse. In the sentence method the beginner is taught sentences rather than letters or words. It is based upon the theory that the sentence is the unit of language and that we think in sentences.

While all the methods of teaching reading possess merit, it may be said that there is no arbitrary plan by which reading can be taught successfully to all students. The most feasible way is to become acquainted with all the methods and use them in combination as the particular needs of the pupil or classes may require. Much depends upon the ability and tact of the teacher. However, it should be aimed to lay a basis for advanced reading, whereby the mind may be trained to become active and scrutinizing. In all grades of teaching the instructor needs to keep in mind the mental, vocal, and physical elements. The mental element is that by which we understand and feel what we read, and embraces the intellectual and emotional powers. The vocal element pertains to the voice, and is concerned with pronunciation and modulation. Pronunciation is the art of uttering words correctly. It includes articulation and accent. Modulation is the variation of voice in speaking and reading. The physical element in reading is concerned with the body and embraces breathing, facial expression, posture, and gesture. In reading much depends upon example and imitation. Hence, the teacher should be a good reader in order to obtain the most satisfactory results. He needs to inculcate the power of thought getting and the ability to convey meaning when reading. The habit of accurate reading, once acquired, is a source of much profit. It makes a good book a useful companion. See American Literature; Literature.

READING (rěďíng), a town of Massachusetts, in Middlesex County, ten miles north of Boston. It is on the Boston and Maine Railway and is noted as a favorite residential center. A public library, waterworks, and electric lighting are among the municipal improvements. It has manufactures of rubber goods, musical instruments, clothing, machinery, and boots and shoes. It was settled in 1638 and incorporated in 1664. Population, 1905, 5,682; in 1910, 5,818.

READING, a city of Pennsylvania, county seat of Berks County, 58 miles northwest of Philadelphia. It is on the Schuylkill River, the Schuylkill Canal, and the Pennsylvania, the Philadelphia and Reading, and the Wilmington and Northern railroads. The site is regularly platted and includes about eight square miles, and the locality is more or less rolling or hilly. East of it is Mount Penn and south is Neversink Mountain, both of which are reached by electric railways. These eminences have a height of about 995 feet, hence afford a fine outlook

over the surrounding country and have provisions for entertaining tourists and visitors. Many of the streets are paved with stone and macadam and traversed by a system of electric railways, which furnish communication with many points and cities in the eastern part of the State.

The city has a fine system of public schools with courses ranging from the kindergarten to the high school. It is the seat of the Inter-State Commercial College, the Schuylkill Seminary, and a number of charitable institutions and hospitals. Near the city, at Kutztown, is the Keystone State Normal 'School. In the northern part of the city are the grounds of the county fair. The Lutheran Trinity Church, the county courthouse, the Federal building, the city hall, and many fine churches are among the noteworthy public buildings. Much of the architecture in the city is modern and substantial, especially the business blocks and office buildings, such as the Baer building and the Colonial Trust building.

Reading is situated in a region of anthracite coal mining, but the agricultural resources are well developed. Here are located the extensive shops of the Philadelphia and Reading Railway. The manufactures include paper, hosiery, pipe tobacco and cigars, machinery, malt liquors, pottery, and iron and steel products. Extensive interests are vested in the manufacture of letter boxes and steel projectiles. It has a large wholesale and jobbing trade and is a market for cereals, live stock, and fruit. The region was settled by Germans in 1748 and a large per cent. of the people are of German descent. It was incorporated as a borough in 1783, but was chartered as a city in 1847, when it had a population of 12,000. Population, 1910, 96,071.

READING, a city of England, in Berkshire, 35 miles west of London. It is at the junction of several railways and has additional trade advantages because of being near the junction of the Kenneth and Thames rivers. Among the notable buildings are the Benedictine Abbey, founded in 1120, and the Church of Saint Lawrence, a structure of the Norman type. It is the seat of several hospitals and educational institutions. The surrounding country is fertile. Among the manufactures are silk goods, machinery, spirituous liquors, flour, and earthenware. Reading was important as early as 871, when it was occupied by the Danes. Population, 1911, 75,214.

REAGAN (re'gan), John Henninger, statesman, born in Sevier County, Tennessee, Oct. 10, 1818; died March 6, 1905. He removed to Texas in 1839, which was then an independent republic, and after studying law was admitted to the bar. In 1852 he was elected judge of the ninth judicial district, serving until 1857, when he was elected to Congress. He resigned his seat in Congress in 1861 to take part in the secession convention of his State, in the same year was

made Postmaster-General of the Confederate States, and in 1865 entered the Cabinet of President Davis as Secretary of the Treasury. In 1865 he was taken prisoner and confined in Fort



Warren several months. He took part in the State constitutional convention of 1875, the same year was elected a member of Congress, and served continuously until 1886, when he was elected to the United States Senate. In 1891 he resigned his

JOHN HENNINGER REAGAN.

seat in the Senate to become chairman of the Texas State railroad commission. He and Senator Cullom were joint authors of the Cullom-Reagan Interstate Commission Act.

REAL ESTATE, the property which consists of lands, tenements, and hereditaments. In law real property does not only consist of land itself, but includes all immovable effects upon it, such as timber, minerals, and buildings. This class of property is distinguished from *personal property*, which consists of movable effects, such as money, furniture, and live stock.

REALISM (rē'al-iz'm). See Idealism.

REAL SCHOOLS, in German Realschulen, a class of educational institutions maintained in Germany. They take a place immediately between the elementary school and the university. There are two classes of real schools, the higher preparing for certain courses in a university and the lower fitting for professions that require no university education. The higher grade is the real gymnasium, as opposed to the gymnasium proper, or classical school.

REAPING, the act of cutting down and gathering grain, as in harvesting wheat, oats, or corn. Reaping is as old as human history, though the instruments used in early times were greatly different from those now employed. The



ANCIENT REAPING MACHINE.

oldest known device for cutting the grain is a reaping hook, or sickle. It was employed by the ancient Jews and Egyptians, and continued in use by the civilized nations down to the latter part of the 19th century. The sickle consists of a curved instrument about two feet in length,

having a wooden handle, and tapering from a width of about two inches near the handle to a point at the opposite end. The edge is sometimes serrated, but generally is plain and sharp like a knife. It is held in the right hand by the harvester, who cuts the standing grain near the surface, holding a handful of it by the left hand. The first few handfuls of grain are made into a band, which is laid on the ground, and when a sufficient amount of grain has been cut and laid on the band, it is bound around it to form the sheaf. After a number of sheaves, usually twelve, have been bound in this way, they are set up to form the shock, in which position the grain is left on the field until sufficiently cured, when it is placed in the stack or barn mow to be threshed.

The process of reaping described here is one that the writer personally witnessed in the harvest fields both of Australia and America, but it has now given way to harvesting by machinery, in which the same work is done by mechanical devices that quite successfully take the place of the human hand. However, improvement in this line was brought about by a long



period of evolution, the ordinary scythe following the sickle, that in turn giving way to the cradle, until finally the machines were produced that are drawn by animals or steam power. The ancient methods of reaping are still used by primitive peoples and to a limited extent in Asia and Spanish America. In some countries, as in ancient times, the harvester cuts the grain by hand and places it in a wooden cart moved by an ox or some other animal. This method is advantageous where the grain is quite ripe and dry, thus insuring it against molding or decay, and it is usually customary in such cases to cut little more than the heads, the remaining portions of the standing grain being either plowed under or used for pasture. See Harvesting Machinery; Mowing Machine.

REASON (rezn), the mental faculty by which man is able to distinguish truth from error, and which places him in the scale of life far above the lower animals. It comprises conception, judgment, reasoning, and the intuitional faculty, and in the philosophy of some writers there is a shade of identity between reason and understanding. Reason can exercise itself on the most abstract and spiritual theories, as well

as on those of a simpler character. It was formerly believed that of all visible creatures man alone possesses reason, but most writers within the last century expressed views favorable to the theory that animals possess some power of reason, a position now generally accepted. It may be that their actions are due to the association of ideas or to instinct, but the former

principle is associated with reason.

RÉAUMUR (rā-ō-mūr'), René Antoine Ferchault de, naturalist and physicist, born in La Rochelle, France, Feb. 28, 1683; died Oct. 17, 1757. He was the son of a French nobleman, was educated in his native city, and made a specialty of studying mathematics, natural history, and physics. In 1703 he removed to Paris, where he published several treatises on geometrical problems, and in 1708 became a member of the Academy of Science. Among his discoveries in natural history are several in connection with the fossil remains found in the rivers and mines of France, his researches enabling him to make a valuable collection of fossil remains of extinct animals. In 1725 he published details of the mode of producing steel from iron and described the method of tinning iron. In 1731 he invented the thermometer that bears his name and in 1739 experimented in making pottery. Réaumur discovered a process of making porcelain quite equal to that manufactured in Saxony and Japan. His papers and published works treat of numerous phases and branches of science, the most important being his "History of Insects," a work in twelve volumes.

REBELLION OF 1838, a revolt against the government of Upper and Lower Canada, brought about largely through the unpopularity of the manner in which the public affairs were organized. A small class of descendants from the Loyalists largely dominated the political forces for several decades. They became known as the Family Compact, which, it was alleged, was maintained to monopolize the public offices. The popular dissatisfaction was enhanced by the apparent frauds in disposing of certain public lands in Lower Canada, where the discontents were under the leadership of William L. Mackenzie (q. v.). At the same time a large faction rose against the government in Upper Canada, under the leadership of Louis J. Papineau (q. v.). In the latter section the contest was largely between the French constituents and the Popular Assembly on the one hand and the English, representing the Governor and the Legislative Council, on the other. In both instances the disturbances were subdued by force of arms. Soon after, in 1841, the two provinces were united by an act of the British Parliament.

RÉCAMIER (rå-kå-myå'), Madame, noted woman of society, born in Lyons, France, Dec. 4, 1777; died May 11, 1849. Her maiden name was Jeanne Bernard. She was the daughter of a wealthy banker and possessed remarkable grace and rare beauty. After attending the con-

vent of La Deserte, where she was trained under the care of an aunt, she was taken by her parents to Paris, and in 1793 married M. Jacques Récamier. He was nearly thrice her age, a man of wealth, and she became enabled to mingle in the society of Paris with a brilliancy and triumph almost without a parallel in Europe. As she was fond of literature, she filled her salon with the finest productions, and made her home the gathering place of the most fashionable and influential literary and political society. Her influence in social and political affairs was remarkable, and she was frequently spoken of as the unacknowledged legislator, since numerous legislative acts were attributed more or less directly to the influence she exercised over a large number of prominent individuals. The fortune of her husband was entirely spent and in 1806 she visited Madame de Stael at Coppet, Switzerland, where the latter had gone after being banished by Napoleon. Her husband died in 1845 and although she had a number of proposals to marry again, among them one from Prince August of Prussia, she remained unmarried. She made a reputation as one of the most noted society queens of France.

RECEIPT (re-set'), a written document which acknowledges the delivery of money or goods. One who makes tender of money or property under contract may demand a receipt therefor in writing as a condition precedent to the delivery thereof. Such a receipt may be given in part or in full payment of a debt. It is evidence of the discharge of a debt or part of the debt which it includes, but may be set aside by evidence that shows beyond a reasonable doubt that it was obtained fraudulently. Those sending goods or money by a common carrier, such as an express or a railway company, receive a receipt when the goods or money are delivered to the carrier or warehouseman. Freight shipments are covered by bills of lading, and the contract of the company under which the shipment is made is usually printed on the

ame.

RECEIVER (re-sever), a disinterested person appointed by a court to receive and disburse the issues or profits arising from property which is in question between the parties through litigation, or which belongs to an infant, or some other person who is not legally competent. The purposes of appointing a receiver are to collect rent or profits, to take charge of and preserve the property from waste or deterioration, and to make final disposition of the goods or property as the court may direct. In some cases such an appointment is made so the business may be conducted, or to prevent the removal of the property beyond the jurisdiction of the court. Since the receiver is an officer of the court and is required to give a bond for the faithful discharge of his duties, he is subject to the law and the judicial decree of the tribunal appointing him.

RECHABITE (rē'kăb-īt), the descendants of Rechab, the ancestor of Jehonadab. These people came to Palestine with the Israelites. They resided in Judah in the time of Jeremiah and, when Nebuchadnezzar invaded Palestine, they took refuge in Jerusalem (Jer. xxxv.). The Rechabites dwelt in tents and abstained totally from the use of intoxicating drinks. A large secret society of total-abstinence men and women, with numerous branches in Great Britain and United States, is known as the Independent Order of Rechabites.

RECIFE (rā-sē'fā). See Pernambuco.

RECIPROCITY (res-i-pros'i-ty), the exchange of commodities between two subjects of different governments without levying import or export duties on the same. It implies trade relations between two or more nations mutually advantageous to the same extent, and is brought about by means of treaties. Reciprocity first began to be advocated as a definite tariff policy in the United States in the period from 1880 to 1890 as a result of a tariff revision in 1883, which proved unsatisfactory to a class of manufacturers who wanted larger foreign markets for their products. President Arthur sent a commission to visit the countries of South America, in 1884, with the view that the question of reciprocity with their governments might be discussed and more favorable trade relations established. This commission reported in favor of tariff reduction on sugar and wool, but as it had not been authorized to promise concessions the effort resulted practically in a failure to secure any revision.

In 1889 the Pan-American congress met at Washington, and, although it favored reciprocity, the result of the conference was not promising, since the delegates differed more or less regarding the extent of reductions that should be made on the more important articles. Besides, a feeling sprung up that reciprocity does not differ materially from tariff revision on the one hand and from that of tariff reduction on the other. However, sentiment in favor of closer trade relations with South American countries has grown steadily, and no doubt a plan will be carried into practice in the near future under which American products will find a larger market in the republics of South America, and on the other hand more will be bought of the commodities which are not produced to a sufficient extent in the United States.

Although England has been a free trade country for many years, a considerable number of its statesmen under the leadership of Chamberlain favor an imperial custom tariff or reciprocity. This idea was proposed early in 1903 and discussion conducted through 1904 and 1905. The movement is calculated to bring about closer trade relations between the colonies and the mother country, through the medium of lowering colonial tariffs to English ports in exchange for retaliatory tariffs against foreign

products competing with those of the colonies. Reciprocity is represented in Europe at present by a large number of commercial treaties, affecting particularly other nations, and as a general rule the trade between colonies and mother countries is free or less restricted than trade generally. The movement in England is calculated to bring about larger trade relations as well as to confine the trade to channels which will contribute to the permanent welfare of England and its colonial possessions.

RECITATIVE (res-i-ta-tev'), the name of a kind of vocal composition adapted to musical notes, forming a medium between ordinary recitation or speaking, which it nearly resembles, and measured air or song. It was introduced at Rome in 1600 by Emilio del Cavaliere, who employed it to express action or passion in operas and oratorios. This style is now used in cantatas and oratorios. It may be delivered by the singer according to his fancy, subject of course to the laws of prosody. The chords are struck by the pianoforte to indicate the harmony, but sometimes the organ and other instruments are used. When the recitation is interrupted by interjected passages performed by the orchestra, it is said to be obbligato.

RECONSTRUCTION (rē-kon-struk'shun), the term applied to the process of bringing back to the Union the states that seceded previous to or at the beginning of the Civil War in America. The Confederate States passed under the military control of the United States when the Confederate army surrendered in 1865, but the states of this federation were regarded as conquered territories and not as members of the Union. President Johnson held the view that these states maintained the same constitutional relation to the United States government as before their secession, and accordingly appointed provisional governors. These governors invited the people to send delegates to conventions with a view of forming constitutions for the respective states. However, Congress upheld the view that these states could be readmitted only on such terms as that body would impose. This view was maintained principally because it was thought that the freedmen would not secure proper recognition of their civil and political rights, if the matter of reconstruction were left entirely to the southern people, many of whom expressed views in opposition to general enfranchisement.

President Johnson had recognized provisional governments in all the southern states before Congress met in December, 1865, on their accepting the Thirteenth Amendment to the Constitution. Congress proposed the Fourteenth Amendment to the Constitution and in 1867 passed the Reconstruction Act, by which five military districts were established in the South. It was the purpose to effect a registration of voters, including Negroes, and these voters were to elect representatives to a convention, which

should make a constitution and submit it to be ratified by the people. It was next to be submitted to Congress for approval, and, whenever the Fourteenth Amendment was ratified by the Legislature, the states ratifying should be reinstated.

From this act resulted the carpetbag government, so called because many designing individuals from the North went to the South to fill offices at favorable remuneration. Under this unsatisfactory condition the leading white men of the South were excluded from participation in the active affairs of the government, the debts of the states affected were increased without receiving value, and the local offices were mismanaged. Many white men, as a means of having satisfactory local government, now organized secret societies, such as the Ku Klux Klan, to prevent the Negroes from voting or holding public offices. Tennessee ratified the Fourteenth Amendment and was readmitted in 1866, hence was not materially affected, but Alabama, Arkansas, Florida, Louisiana, North Carolina, and South Carolina were readmitted under this special act in 1868. It was also required that the amendment be ratified by Georgia, Mississippi, Tennessee, and Virginia, which states were readmitted in 1870. Two years later, in 1872, Congress passed the amnesty act, which removed the disqualification of the ex-Confederates. The reconstruction period ended in the administration of President Hayes, who withdrew from the South the army of Federal

RECORD (rěk'ērd), a written memorial or account of a fact or event of public interest, made by a public official and preserved as a matter for future reference. Records may be public or private, but the latter do not come within the provisions of the law. Public records may be classed as judicial, legislative, or miscellaneous, the latter term embracing all official records that are neither judicial nor legislative. Both the books and the original papers pertaining to a cause at law are judicial records. Any one desiring a certified copy of a public record may obtain it on demand by paying the legal fee therefor.

RED, one of the three primary colors, seen at the end of the spectrum, owing to the fact that its rays are at least broken or refrangible. Red pigments or coloring matters are obtained from the mineral, animal, and vegetable kingdoms. Vermilion and the red ochers are obtained from the mineral, carmine and scarlet from the animal, and madder pigments from the vegetable world. Red is one of the colors adopted by many nations and is the color of the flag used by the anarchists.

RED BANK, a town of New Jersey, in Monmouth County, 25 miles south of New York City. It is on the Shrewsbury River, which furnishes transportation facilities, and on the Pennsylvania and the Central of New Jersey rail-

ways. Many business men of Jersey City and New York reside here. It is visited during the summer by tourists, having many fine hotels and other attractions. Among the features are the high school, the public library, and the Red Bank Shrewsbury Academy. Clothing, carriages, steam boilers, and machinery are among the manufactures. It was settled in 1650 and incorporated in 1872. Population, 1910, 7,398.

REDBREAST. See Robin.

RED CLOUD, the popular name of Maqpeya-luta, a chief of the Ogalala Sioux Indians. He was born in Nebraska in 1825 and became noted at an early age for bravery upon the warpath and wisdom in council. In 1863 he fought against the government and remained hostile for five years. He joined Sitting Bull in opposing the sale of the Black Hills and the surrender of their possessions in South Dakota and Wyoming. In 1890 he joined in celebrating the ghost dance. He was a delegate to Washington, D. C., several times. He died Dec. 10, 1909.

RED CROSS SOCIETY, an international society for the relief of the sick and wounded in the time of war, now recognized as an important factor in military sanitation. It may be said to have originated from the recommendations made by Henri Dunant, a Swiss gentleman, who, in 1859, served on the medical force in the Italian wars. At the close of the war he published a work calling attention to the needless hardships endured by the sick and He recommended that a universal wounded society for the care of disabled soldiers be organized, and that the sick and wounded be regarded as neutrals in the time of war. Soon after he secured aid and coöperation from the Swiss federal council in calling an international conference, which met in Geneva on Oct. 26, 1863, in which sixteen of the leading nations were represented, but since then the number of powers signing the conditions required has increased very materially.

The principal conditions to be complied with by each nation joining the association is the provision that a society is to be maintained by each power, which is to care for the sick and wounded in the time of war, and to devote attention to the training of nurses and preparation of hospital stores in the intervening time of peace. Provisions were made whereby the general society is bound to cooperate by sending representatives and nurses to any country where war, famine, pestilence, floods, or any other great calamity may exist, though the Geneva treaty extends protection only in the time of war. The first provisions for supplying aid in naval warfare were adopted at Paris in 1868, and later other features were added at an international conference held at Berlin. The badge of the society is a red cross on a white background, and it must be accompanied in time of service by the banner of the country in which the society operates. Queen Victoria

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issued an order to institute the Royal Red Cross in 1883, which adopted a red Maltese cross as the decoration, bearing the words, Faith, Hope and Charity. The American society was formed under the direction of Clara Barton. This society raised \$100,000,000 in 1917, and subsequently other large sums were raised for war relief.

REDFIELD, William Cox, public man, born at Albany, N. Y., in 1858. He became a manufacturer of engines and heating apparatus, and in 1902 was chosen commissioner of public works in the Borough of Brooklyn. In 1910 he was elected to Congress, where he served efficiently on important committees. He became Secretary of Commerce in the Cabinet of President Wilson in 1913.

REDFISH, the name of several fishes, found chiefly off the southern coast of the United States and in the waters off the coast of California and Lower California. One of the species is the familiar *rcd drum*, or *channel bass*, which has a grayish red color and is from three to five feet long. It is caught in the Gulf of Mexico as a food fish. A species frequently called *flathead* is abundant in California.

REDGRAVE (rēd'grāv), Richard, painter, born in London, England, April 30, 1804; died Dec. 14, 1888. His paintings include "Country Cousins," "Hidden Among the Hills," and "Gulliver of the Farmer's Table."

RED JACKET, an Indian chief of the Senecas, born near Lake Seneca, New York, in 1752; died on the Seneca reservation near Buffalo, Jan. 30, 1830. His Indian name was Sagoyewatha, meaning "He keeps them awake," but he was named Red Jacket from a scarlet jacket presented to him early in the Revolution by a British officer. He fought with the Six Nations against the colonists during the Revolution, but helped the Americans against Tecumseh in 1809-10, and fought against the British in the War of 1812. He lost his position as chief for a time after retiring to the reservation on account of intemperate habits, but was afterward reinstated. Red Jacket was sagacious as a statesman and eloquent as an orator, but persistently opposed the establishment of Christian missions and schools. He was the last chief of his tribe, hence is sometimes called the last of the Senecas.

REDLANDS, a city in San Bernardino County, Cal., 68 miles east of Los Angeles, on the Southern Pacific and the Santa Fé railroads. It is in one of the greatest orange producing sections of the world and has a large shipping trade in fruit, wheat, barley, and building stone. The chief buildings include the high school, Smiley public library, Y. M. C. A., and many churches. It was settled in 1881 and incorporated in 1888. Population, 1910, 10,449.

RED MEN, Improved Order of, a fraternal and beneficial society which succeeded from the Sons of Liberty, one of the organizations to promote the Revolution in America. It was

reorganized at Baltimore, Md., in 1835, since which time it has increased greatly in membership. Three degrees are conferred, those of Adoption, Warrior, and Chief. The officers are named in reference to certain officials among the Indians, such as prophet, sachem, senior sagamore, junior sagamore, chief of records and keeper of wampum. In 1916 the order had a membership of about 450,000. In addition it maintains the Degree of Pocahontas, which has a membership of 62,500. The motto is Freedom, Friendship and Charity.

REDMOND, John Edward, statesman, born in Dublin, Ireland, in 1856; died March 6, 1918. He studied at Trinity College, Dublin, was admitted to the bar and became a member of Parliament, representing New Rose until 1885, when he was elected for North Wexford. In 1900 he became the leader of the Nationalist party, in which he continued active for Home Rule until his death. He declined the honor of holding a position in the coalition cabinet of 1915.

RED RIVER, an important western tributary of the Mississippi, the most southerly affluent of that river. It rises in the Staked Plain in Texas, near the boundary of New Mexico. It receives the water from the Negro, Washita, and Little Washita rivers. Owing to its winding course, the Red River has a length of 1,550 miles, of which about 1,200 miles are navigable. It was so named from the color of the sediments carried by it in a period of high water.

RED RIVER, or Song-Koi, a river of French Indo-China, in Tongking, rising in the highlands of southern China. After a course of 650 miles toward the southeast, it discharges through a delta into the Gulf of Tongking. In its course are several rapids. On its banks is the city of Hanoi, the capital of Tongking.

RED RIVER OF THE NORTH, a river of the United States and Canada, forming the principal part of the boundary between Minnesota and North Dakota. The Otter Tail rises in the lake region of western Minnesota, near the source of the Mississippi, and has a general course toward the southwest until it makes a bold curve near the border of the State and then joins the Bois de Sioux to form the Red River of the North, which flows nearly due north into Lake Winnipeg. Among its numerous tributaries in the United States are the Goose, Sheyenne, Wild Rice, Marsh, and Red Lake rivers. Its total length is 660 miles, of which 520 miles are in the United States. The Assiniboin joins it in Manitoba, at the city of Winnipeg. The Earl of Selkirk made the famous Red River settlement, on the banks of the Red River of the North, in 1812. It was founded on a tract of land obtained from the Hudson Bay Company, which was afterward conveyed back to that company, and in 1870 was transferred to Canada. It is now a part of the Province of Manitoba.

RED SEA, or Arabian Gulf, an inlet from

the Indian Ocean, lying between Africa and Arabia. It communicates with the Gulf of Aden by the Strait of Bab-el-Mandeb, and stretches in a narrow expanse of water toward the northwest to the Isthmus of Suez, which separates it from the Mediterranean. Its length is 1,450 miles and its width in the central part is about 200 miles, whence it gradually diminishes toward the extremities, being about 20 miles wide near the Strait of Bab-el-Mandeb. It is divided in the upper part by the Sinai peninsula, thus forming the two gulfs of Suez and Akabah. The former is the larger of the two, being 180 miles long and 25 miles wide, while the latter is 100 miles long and about 12 miles wide. The Red Sea has been an important seat of commerce from remote antiquity and was navigated by the ancient Egyptians, Phoenicians, Arabs, Hebrews, and Persians.

Navigation of the Red Sea is more or less dangerous, owing to the prevalence of violent winds and the numerous shoals, islands, and coral reefs that abound along the shores. Coral reefs are particularly abundant near the Arabian coast, where they are remarkable for their scarlet tints mingled with white. A strong current of wind blows from the south from October to May, and from the north from May to October. This results in a current of water passing though the Strait of Bab-el-Mandeb in the former season, which raises the sea level several feet, but it is correspondingly lowered in the period in which the wind blows from the north. Much of the trade from Southern Asia passed up the Red Sea and was conveyed by caravans to the Mediterranean until the route around the Cape of Good Hope was discovered, when it was turned largely in that direction, but in 1870 the Suez Canal was opened to trade, which immediately reëstablished the Red Sea as an important highway between the Orient and the Occident. Considerable trade is carried across the sea, but this consists chiefly of local products and the traffic in connection with pilgrims to Mecca. Jedda, Hodeida, and Mocha are the principal scaports on the Arabian coast and Kosseir, Massowa, Suez, and Suakim on the African coast.

REDSTART, a genus of American birds, which are native to a region extending from Canada to Bolivia. About a dozen species have been described. They are very active, being skilled in catching flies and other insects while on the wing. The male of most species has a glossy black color, with spots of white and orange red on the wings and tail, and the female is brownish. The common redstart of the Old World is somewhat larger and resembles the redbreast. It has a melodious song and may be domesticated. Redstarts are migratory.

ŘEDTOP, the name of several species of grass grown extensively for hay and pasturage. It is sown in most localities with timothy and

clover and thrives best in soils that are too moist for the growth of other cultivated grasses. All the species are valuable because they maintain themselves against the growth of weeds and other grasses of less value. Some species are small and are sown to decorate lawns and parks.

RED WING, a city in Minnesota, county seat of Goodhue County, on the Mississippi River, forty miles southeast of Saint Paul. It is on the Chicago Great Western, the Chicago and Northwestern, and the Chicago, Milwaukee and Saint Paul railroads. The noteworthy buildings include the county courthouse, the high school, the public library, the Lutheran Ladies' Seminary, and the Lutheran Theological Seminary. It has well-graded streets, systems of sewerage and waterworks, and a well-graded system of public schools. Among the manufactures are boots and shoes, furniture, lumber products, machinery, stoneware, flour, and earthenware. The surrounding country is agricultural and dairying. It was settled in 1853 and incorporated as a city in 1864. Population, 1905, 8,149; in 1910, 9,048.

REDWOOD, a species of sequoia, native to the Pacific coast of North America, but found chiefly in Oregon and California. It is one of the largest trees in existence, attaining a diameter of 12 to 15 feet and a height of 225 to 300 feet. The name redwood is applied because the newly cut wood has a reddish color, but it soon fades on exposure to light and the air. The grain of the wood is straight, is well fitted for inside finishing of buildings, and takes a good polish. The forests are maintained by seeds and suckers sent up from the stumps. See Sequoia.

REED, in music, the mouthpiece of the bassoon, hautboy, clarionet, and several other instruments. Reeds were first made of cane, whence the name has been extended to the reeds of the organ and the harmonium. They are now made of a thin strip of metal. The reed itself does not produce the sound, but is only the means of obtaining the sound from the current of air directed against it. Two classes of reeds are in general use, the striking and the free. The striking reed is commonly used in the pipes of an organ and requires to be placed in a tube as a means to produce a musical sound. The free reed, such as is used in the harmonium, has a smoother and more mellow sound than the striking reed and does not require a pipe, as does the latter.

REED, Thomas Brackett, statesman, born in Portland, Me., Oct. 18, 1839; died Dec. 6, 1902. He graduated from Bowdoin College in 1860, studied law, and in 1864 entered the navy as assistant paymaster. In 1865 he began the practice of law at Portland and in 1868 became a member of the Maine Legislature. He was attorney-general of the State for two years, was city solicitor of Portland for four years, and in

while in others it is obligatory, that is, the laws

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1876 was elected as a Republican to Congress, where he served continuously until retiring from political life on April 20, 1899. Reed became



THOMAS B. REED.

a leader of his cer, though many public men at first

criticized his rulings as arbitrary, but in viewing his positions in the light of history they may be said to have resulted in better and more efficient legislation. His resignation was due to the fact that he regarded it in line with his duty to his family to secure a larger income than is shared by persons holding public office, and he was succeeded as speaker by David B. Henderson of Iowa. It may be said that Reed is considered by all parties one of the most able statesmen of America. He did not favor the so-called expansion policy supported by the administration of William McKinley, sharing in this the view of Benjamin Harrison. He is the author of Reed's "Rules of Parliamentary Law" and contributed many articles to magazines and encyclopaedias.

REEVES (revz), John Sims, eminent tenor singer, born near London, England, Oct. 21, 1822; died Oct. 25, 1900. His father resided at Shooter's Hill, where the youth received his early training in music, and at fourteen years became organist of North Gray Church. Later he learned to play on various instruments, appearing often as an orchestral leader, and in 1839 sang as a baritone at Newcastle Theater. In 1841 he joined a company at Drury Lane under Macready, but soon after took musical training at Paris and Milan, and in 1847 appeared at Drury Lane, where he attained high distinction. He is noted particularly because of his high quality of oratorio and ballad singing and long ranked among the first tenor singers. He gave up concert singing in 1891, and the

following year was elected professor of the London Guildham School of Music. REFERENDUM (ref-er-en'dum), the name used to designate the practice of submitting to a vote of the people for approval or rejection

the laws passed by their representatives in a legislative capacity. Such laws are first passed by the legislature and properly certified, and they are then submitted at the next regular election for consideration by the electorate. In some countries the referendum is optional,

party on the floor of the House soon after entering Congress, owing to his efficiency as a speaker and parliamentarian, and served as speaker of the House in the 51st, 54th, and 55th congresses. He was vigorous as a presiding offimust be submitted without petition. The initiative is the logical complement of the referendum, since it enables the people to draw up their own laws, which are then submitted to the legislature, or they may be proposed by petition and submitted without any action on the part of the legislative branch. Both the initiative and the referendum are in use in some form in all the cantons of Switzerland, except Freiburg. Both are in vogue as a feature of the government of the Swiss Confederation, and under a provision of the constitution it is obligatory to submit any law on demand of eight cantons, or a petition signed by 30,000 citizens. The referendum was adopted in Switzerland in 1874 and the initiative was made a feature of the government in 1891. In Canada and the United States the referendum is employed to a considerable extent, especially in matters of municipal government, such as permitting the sale of intoxicating liquors, granting franchises to electric railway and other corporations, and issuing or refunding town and city bonds. REFLECTION (re-flek'shun), the power

that the mind has to consider and compare sensations and ideas by the aid of the principles of association. It is one of the primary sources of all ideas, the other source being sensation. Some writers, as Herbart, discuss analysis and synthesis as integral parts of reflection. See

Psychology.

REFLEX ACTION, the name applied to any action performed involuntarily in consequence of an impulse transmitted along certain nerves to a nerve center, whence it is reflected to an efferent nerve, hence inducing action in certain muscles, organs, or cells. Reflex action has its seat chiefly in the brain and spinal cord. The majority of these phenomena are very complicated, varying greatly in the intensity and rapidity, as in a series of coughs to remove dust from the air passages. Extensive research has shown that the impulses from the receiving surface toward the interior and from the central cells outward are transmitted with equal facility, that the rate of motion is much slower than that of electricity, and that only a small amount of energy is extended in the transit. Natural electric currents pass over the fiber, but no chemical or physical changes in the fibers resulting from the passage from impulses have been detected. Waste of tissue and weariness accompany the expenditure of energy, but the exact volume of waste cannot be determined.

REFORMATION (ref-or-ma'shun), the great religious revolution of the 16th century, which may be said to mark the end of the Middle Ages and the establishment of Protes-Western Europe was under the absolute authority of the Roman popes from the year 800, when Pope Leo III. crowned Charlemagne emperor of the Romans, until restricted by the results following the Reformation. In this period of about 800 years papal authority was supreme over all the Christian Church, except only the countries where the Greek Church had secured a foothold, and this authority was exercised both in spiritual and temporal affairs. Various abuses arose from this widespread power, against which many devoted members of the Roman Church protested and from which both laymen and clergymen sought to secure relief.

Many causes may be assigned as the incentives that induced the people to rise in this mighty religious revolution, some of which extended back to the early introduction of the Papacy. Although many efforts had been made to revise the doctrines and ceremonies of the church, such as confession to a priest, the invocation of the saints, and the devotion to the Virgin Mary, the first organized movement did not occur until the early part of the 15th century. It was led by John Huss and Jerome of Prague, in Bohemia, but they and their followers were not able to wield a widespread influence, since conditions had not formed that contained the necessary elements to crown such a movement with success. Among the events that formed and molded public opinion favorable to a great reformation were the invention and general use of printing, the diffusion of knowledge through universities teaching the Greek and Hebrew languages, and advancement in industrial arts and commerce, all tending to lead the people to assert their independence of thought and energy. Besides, the rise of modern literature occasioned by the Renaissance brought forward such writers as Erasmus, who held the abuses of power up before thoughtful men. The last spark needed to kindle a widespread revolution of thought was furnished in the pontificate of Leo X., when Johann Tetzel, a Dominican monk of Leipsic, published indulgences in Germany, to procure means for the building of Saint Peter's at Rome.

The appearance of Tetzel in Saxony was followed immediately by the pronounced opposition of Martin Luther, an Augustine monk and professor of theology in the University of Wittenberg, who, on Oct. 31, 1517, posted 95 theses or questions on the door of the church. His able sermons won many adherents among the influential nobles and princes, who united with him in urging the Pope to suppress the traffic in indulgences and otherwise reform various practices. This brought him into conflict with Pope Leo X., who excommunicated him in 1520, but Luther appealed to a general council. However, his works were burned at Cologne, Mentz, and Louvain, and he retaliated by publicly burning the papal canons and decrees. When Luther formally separated from the Ro man Church, he was followed by many German nobles, while most of the eminent scholars, and particularly the University of Wittenberg, declared in favor of the reformed faith. In 1521 he was summoned before the Diet of

Worms by Emperor Charles V. of Germany, and his bold refusal to recant not only increased the reform movement, but made it a political matter in the North German States. Soon after the Bible was translated and published in the German language, Luther's "Liturgy" appeared in 1522 and was immediately adopted by Magdeburg and other cities, and translations of the Bible into the Dutch and French languages soon followed. The reformed faith received legal recognition for the first time by the Peace of Augsburg in 1555, which gave each prince liberty to adopt either the Protestant or Roman Catholic faith.

Protestantism was carried to Sweden under Gustavus Vasa, who became king in 1523, and it was formally adopted in the Danish dominions at a diet held in 1536. Lutheranism found many adherents in Hungary and Poland, but it was kept out of Italy and Spain by the vigorous application of the Inquisition. Zwingli and Calvin carried Protestantism into Switzerland and various parts of France, while John Knox embraced that faith in 1543 and gave it a firm foothold in Scotland. The first separation from the Roman Church occurred in England under Henry VIII., in 1527-47, but the movement was made more spiritual by improvement in the translations of the Bible and the adoption of the articles or confessions in the period between 1547 and 1573, and Protestantism became finally established under Queen Elizabeth. It may be said that the view taken by Lord Macaulay in regard to the Reformation is the correct one, since he looked upon the movement as consisting of two distinct phases, one applying to a reformation of the doctrine in the northern part of Europe, and the other in reforming the doctrine and discipline of the church in the Latin and Spanish countries. The intellectual impulse communicated by the Reformation is still in force and will never cease to exist. See Gustavus II.; Luther, Martin; Thirty Years' War.

REFORMED CHURCH, the name given first to the Helvetic Church, which rejected certain doctrines of Luther concerning the sacrament of communion, regarding it simply a commemorative ordinance. The term is used in history to comprehend all those churches that were organized as a result of the Reformation. but it is applied specially to several branches resulting from dissensions arising at conferences, such as the Reformed Presbyterians and the Reformed Episcopalians. The Reformed Church of the United States is a German body organized in Pennsylvania by settlers from Germany, about 1684. It now has 1,685 churches and 250,000 communicants, and maintains a number of missions and institutions of higher learn-The most important institutions include Franklin and Marshall College, Lancaster, Pa.; Heidelberg University, Tiffin, Ohio; Palatinate College, Myerstown, Pa.; and Catawba

College, Newton, N. C. The Reformed Church of America is a Dutch organization and was established in the United States in 1628 by members of the Reformed Church of Holland, who settled at New Amsterdam, now New York. It has 625 churches, 125,000 communicants, eight institutions of higher learning, and a number of missions. The principal colleges are at Holland, Mich.; New Brunswick, N. J.; and German Valley, Ill.

REFORM SCHOOL, an institution maintained to train juveniles who have been convicted of crime. Schools of this kind are now more generally termed industrial schools, since they teach various industries in connection with the common branches of study, and this name has been adopted at least in part because it is less objectionable to those who are completely reformed after systematic training. Usually these institutions are located on a large tract of land, frequently from 100 to 300 acres, and the industries include gardening, fruit growing, stock raising and general farming. Those confined usually receive instruction half of the time, and the remainder of the day is devoted to work in the yards or fields. These schools generally have laundries, bakeries, and various shops, the purpose being that all of the repairing as well as the domestic service is to be done by the inmates. Juveniles are thus separated from the older and hardened criminals, and are educated in the fundamentals as well as the domestic and industrial arts. The first institution of this kind in America was established by an act of the Legislature of New York, in 1824, under the name of the New York House of Refuge. They are very numerous at present. Practical experience has demonstrated their utility in training and reforming.

REFRACTION (re-frak'shun), the change in the direction of all kinds of wave motion, as in light and heat, when the waves enter obliquely a medium of a different density from that through which it previously moved. In astronomy the term is applied to the change in the direction of a ray of light resulting from its passage through the atmosphere of the earth, and, consequently, to the change in the apparent position of a heavenly body from which the light emanates. Refraction has the effect of causing the heavenly bodies to appear higher in the sky than their real position, but it is greatest at the horizon, where it is about 38'. It decreases uniformly toward the zenith. Refraction has the effect of causing the heavenly bodies to appear to rise earlier and set later than they actually do, hence we see the sun in the morning while the entire disc is yet below the horizon. For the same reason, we see it in the evening a short time after it has passed the horizon. A familiar illustration of the refraction of light may be seen by immersing a stick partly in a glass of water, when the refraction of light will cause it to appear bent where it

enters the water. It is due to refraction that the visible part of the sun during a partial eclipse appears relatively larger than the portion covered by the disc of the moon. Twilight, the gradual change from daylight to darkness, is the effect of the successive refractions of the light by the successive layers of the atmosphere.

REFRIGERATION (re-frij-er-a'shun), the art of employing artificial means to reduce the temperature. It was practiced in very ancient times, but improved apparatus and systems to promote commercial refrigeration on a commercial scale are comparatively recent. The process depends upon the law of physics that any substance passing from a liquid to a gaseous state absorbs a certain amount of heat and, on the other hand, it gives off the same amount of heat when returning from a gaseous to a liquid state. As a means of promoting refrigeration a number of agencies may be employed, such as compression, condensation, absorption, lique-faction, and the vacuum process.

In ordinary household economy it is customary to use a common ice refrigerator, which consists of a chamber or box holding a supply of ice to cool provisions and keep them from spoiling in warm weather. Most refrigerators have two compartments, in the upper of which ice is stored to supply cooled air to come in contact with the provisions in the lower compartment, whereby they may be kept near the freezing point. Refrigerators used for household purposes are on this plan and have a device to carry off the water that results from the ice melting. Those used in meat markets are much larger than the devices employed for household purposes, but the same principles are utilized in them and in refrigerator railroad The latter are employed in transporting cars. meat, fruit, and other perishable commodities. See Ice.

REGELATION (rē-jê-lā'shun), the name applied to the freezing together of contiguous surfaces without the application of outward cold, as in the case of two large blocks of ice. This phenomenon is common to all substances which increase in volume upon freezing. When two pieces of ice are brought in close contact and submitted to pressure, the surfaces melt, and the two pieces are united by freezing when the pressure is relieved. Faraday discovered this phenomenon in 1850, and Lord Kelvin demonstrated that snow in the tracks of wheels is covered with a thin film of ice, owing to the fact that pressure of the vehicles causes it to melt and that it freezes as soon as the pressure is removed. According to this theory, a snowball is solidified not by compressing a given quantity of snow into a smaller body, but by small particles melting under pressure and then solidifying by regelation. The movement of glaciers is greatly modified by this phenomenon.

REGENERATION (re-jen-er-a'shun), the

Christian doctrine formally expounded by Jesus in his interview with Nicodemus, which is generally held to be a radical and permanent change wrought in the spiritual nature of man by the Holy Spirit through faith in Christ. Regeneration is regarded by some churches as the beginning of the new life conferred in baptism, which is called the sacrament of regeneration, while others look upon it as a change in the governing purpose, or as the creation and continuation by the Holy Spirit of a new series of holy acts.

REGENSBURG (ra'gens-boorg), or Ratisbon, a city of Germany, capital of the Bavarian province of Upper Palatinate, on the Danube, 65 miles northeast of Munich. It is important as a commercial and railroad center, is strongly fortified, and has many interesting monuments dating from the Middle Ages. The streets are broad and well improved, having pavements of stone and asphalt, electric and gas lights, rapid transit, and numerous squares and parks. Among the noteworthy buildings are the Church of Saint James, a Byzantine structure of the 12th century, the townhall, and the Royal Library, containing 75,000 volumes. It has a splendid monument in honor of Kepler, the astronomer, who resided and died in Regensburg. The manufactures include beet-root sugar, jewelry, paper, metalware, pottery, soap, scientific instruments, and machinery. The city is one of the most ancient of Germany, having been founded by the Celts under the name of Radasbona. In the time of the Romans it was fortified and named Castra Regina. Since 1810 it has belonged to Bavaria. Population, 1905, 48,801; in 1910, 52,540.

REGENT (re'jent), the name applied to a ruler who governs a monarchy during the minority, absence or disability of the sovereign. The duties of this office usually devolve upon the nearest relative of the sovereign who is capable of undertaking them, especially in hereditary monarchies. The term is applied in the State of New York to a body of commissioners in whom is vested the superintendence of public instruction, and in many states to the presiding officer of the university. The term is used similarly in various countries in Europe, particularly to designate a member of one of the universities of England.

REGILLUS (re-jil'lus), a lake mentioned in the history of ancient Rome, situated southeast of the capital, in the crater of the extinct volcano Cornufelle. It is celebrated in legendry as the scene of an important battle in 496 B. C., between the Romans and Latins, in which the former attained a signal victory. The lake was drained in the 17th century.

REGIMENT (rěj'í-ment), a body of regular troops, whether infantry, cavalry, or artillery. This division of a military organization consists of from two to four battalions, differing somewhat in various countries, and numbers

about 1,000 men. It is the largest permanent association of soldiers, the third subdivision of an army, several regiments constituting a brigade and several brigades a division. The regiment is commanded by a colonel, one or more lieutenant colonels, and several majors, according to the battalions into which it is divided. Subdivisions of the battalions are known as companies, each of which is commanded by a captain and one or more lieutenants. The regiment originated in France about 1560 and is now a subdivision of the troops in nearly all civilized countries.

REGINA (re-ji'na), the capital of Saskatchewan, in a flourishing agricultural and stockraising section, on the Canadian Pacific and the Canadian Northern railways. It is the head-quarters for the Northwest Mounted Police. The principal buildings include those of the government, the high school, the public library, the King's and the Wascana hotels, and several fine churches and business houses. It has large grain elevators, flouring mills, machine shops, pressed brick factories, iron foundries, and a growing commercial trade. Large quantities of wheat and live stock are shipped to points both east and west. The waterworks and electric power plant are owned by the municipality. Population, 1901, 2,249; in 1911, 30,213.

REGNAULT (re-nyō'), Alexandre Georges Henri, eminent painter, born in Paris, France, Oct. 31, 1843; fell in battle Jan. 19, 1871. He was a son of Henri Victor Regnault (1810-1878), a French chemist and physicist, and studied art in Paris and Rome. After remaining in Rome two years, he went to Spain in 1869 to paint landscapes and views in relation to Moorish architecture and life. In 1870 he returned to France, where he entered the army as an enthusiastic supporter of the imperial government in the Franco-Prussian War, and was slain on the battlefield of Buzenval. His most famous painting is "Execution Without Judgment under the Moorish Kings of Granada." A monument in Paris commemorates him.

REGNIER (re-nyā'), Henri de, poet, born in Honfleur, France, in 1864. He studied at the Collège Stanislas, Paris, and published his first volume of poems in 1887. His productions are numerous and of a classical nature. In 1900 he was awarded the Vitet prize by the France Academy, and in the same year directed a series of lectures to the French Cercle Français. Among his writings are "Sites," "Episodes," "Le trèfle blanc," "Le corbeille des heures," "La double maîtresse," and the essay entitled "Mallarmé," first published in the Revue de Paris.

REGULUS (reg'ū-lūs), Marcus Attilius, Roman consul and general. Little is known of his early life, but it is certain that he was first elected to the consulship in 267 B. C., and that he received the honor of a triumph for his military successes soon after. He was made consul a second time in 256 B. C., and soon after headed a navy of 330 ships against the Carthaginians in the First Punic War. An engagement occurred off Heraclea Minor, in which the Romans were successful, and shortly after Regulus established a station near Clypea. He was victorious in a number of encounters, but in 225 B. c. the Spartan Xanthippus commanded the forces of Carthage and not only defeated the Romans, but made Regulus a captive. On the arrival of reinforcements from Rome, Regulus was sent to the capital on parole to urge a treaty of peace, but when he reached Rome he urged the senate to refuse conditions of peace or the exchange of prisoners. On returning to captivity he was put to torture and died from the effect.

REHAN (re'an), Ada, actress, born in Limerick, Ireland, April 22, 1860; died Jan. 1, 1916. She came to America in 1866, and, after attending school, fitted herself for the stage. From 1873 to 1875 she filled an engagement in Philadelphia and subsequently played successfully in Baltimore, Albany, and New York City. In the last mentioned city she was in the theater of Augustin Daly from 1879 until the death of the proprietor, and subsequently played with much success in France, Germany, and England. Her ability as an actress in farcical plays and high comedies won her a high place among American actors. Her chief rôles were as Katharine in "Taming of the Shrew" and as Rosalind in "As You Like It." She played successfully as Peggy in "The Country Girl," as Valentine Osprcy in "The Railroad of Love," as Nancy Brasher in "Nancy and Company," and as Maid Marian in Tennyson's "Foresters."

REICHENBACH (rī'ken-bäk), Karl, Baron von, naturalist and technologist, born in Stuttgart, Germany, Feb. 12, 1788; died in Leipzig, Jan. 19, 1869. He was educated at Tubingen, and soon after conceived the project of establishing a German state in the South Sea, which was made an excuse for the Trench authorities to cause his arrest and confinement in the Hohenasperg fortress. Soon after his release his attention was turned to natural sciences and industrial arts, and in 1821 he established a number of manufacturing enterprises in Moravia. These not only proved highly successful, but were so profitable that he purchased large estates in Württemburg and was created a baron by the king. He continued his scientific investigations and succeeded in discovering paraffin, creosote, and a number of compounds previously unknown. In later life he engaged enthusiastically in the study of animal magnetism, discovering an influence in nature known as the odylic force. His most important publications are "Treatise on Geology,"
"Year Book of Chemistry and Physics," "Sensibility and the Odylic Force," and "Relations of Magnetism and Electricity to the Phenomena of Life."

REICHSTADT (rik'stät), Napoleon François Joseph Bonaparte, the name of the only child of Napoleon I. and the Empress Maria Louisa, but called Napoleon II. by the Bonapartists. See Napoleon II.

REID (red), Mayne, soldier and author, born in Ulster, Ireland, in 1818; died in London, Oct. 22, 1883. He was educated for the church, but came to America in 1838 in search of a fortune. Much of his life in the United States was spent in roving adventures, in which he visited many states and studied the habits of Indians and pioneers on the frontiers. In 1845 he joined the American army and served through the Mexican War, attaining the rank of captain and taking part in the battles of Vera Cruz and Chapultepec. He returned to England in 1849 and began the career of a novelist. Reid wrote many interesting narratives of his adventures in the Mexican War and on the American frontiers. His best known writings include "Scalp Hunters," "The Headless Horseman," "The Rifle Rangers," and "The White Chief."

REID, Robert Gillespie, railroad contractor, born at Coupar Angus, Scotland, in 1842; died June 3, 1908. At an early age he went to Australia to engage in gold mining, where he also supervised the construction of bridges and mining property. In 1871 he came to America, thinking that he could better himself my promoting enterprises in Canada. He had charge of the construction of the international bridges across the Niagara River and across the Rio Grande, and in 1893 took a contract with the government of Newfoundland to construct a railway across the island from Saint John's to Port-aux-Basque at the rate of \$15,000 per mile. Subsequently he contracted to operate the railways in the island for a period of fifty years, and received land grants in part payment and for constructing telegraph lines.

A large majority of the people protested against a number of contracts made with Reid for the construction of docks, street railways, and railroads, which finally caused the resignation of Governor James Winter and his cabinet and the election of Liberals to control the government. This brought about a settlement between the government and Mr. Reid, by which it was agreed that the property of the Reid Newfoundland Company was to revert to the government at the end of fifty years on payment of \$1,000,000 and such additional sum as might be awarded by a board of arbitration. The transactions and grants by the government, though instrumental in developing many resources of Newfoundland, stand as examples of recklessly giving public interest over to private corporations. He was knighted in 1907 as a recognition of his service in developing the resources of Newfoundland.

REID, Thomas, philosopher and author, born in Strachan, Scotland, April 26, 1710; died Oct.

7, 1796. He graduated from Aberdeen College in 1726, where he remained as librarian for ten years, spending much of his time in careful study. He was appointed minister of the parish church of New Machar in 1737 and labored incessantly until 1752, when he was elected professor of moral philosophy in King's College, Aberdeen. The professorship of moral philosophy in the University of Glasgow was given to him in 1763. Soon after he published his philosophical work, "Inquiry Into the Human Mind." Reid was a patient, industrious thinker, but not a rhetorician. His style was simple and unadorned, but very clear. Among his writings are "Essay on Quantity," "Philosophy of the Intellectual Powers," and "Essays on the Active Powers."

REID, Whitelaw, journalist, born in Xenia, Ohio, Oct. 27, 1837. He graduated from Miami University in 1856, and soon after took editorial



WHITELAW REID.

charge of the Xenia News. At the beginning of the Civil War he became the Washington correspondent of the Cincinnati Gazette, in which his articles appeared over the name of Agate and attracted general attention. Later he proceeded south with

the army to describe various engagements, thus contributing much of value to war history. He accepted an editorial position on the New York Tribune in 1865, then edited by Horace Greeley, and at the death of the latter succeeded to the ownership of that journal. His ability and energy were not only sufficient to maintain the high standard of the paper secured under its former eminent editor, but he made it a political and financial success, taking prominent part in molding public opinion. President Harrison appointed him minister to France in 1889 and in 1892 he became the candidate of the Republican party for Vice President along with Benjamin Harrison, but the ticket failed of election. He represented the United States at the coronation of Edward VII. in 1902, and three years later President Roosevelt made him ambassador to England. Reid was for some time regent of the University of the State of New York, served as president of the Lotus Club of New York City, and is the author of a number of books relating to the war and to political subjects. Among the most noted are "After the War," and 'Ohio in the War." He died Dec. 15, 1912.

REIKIAVIK (rā'kyà-vēk), or Reykjavik, a city_in Iceland, capital of Danish America. It is situated in the southwestern part of the island, on a large bay, and has a considerable trade in merchandise. The capitol building has a fine library and a museum of Icelandic antiquities. Besides common schools, it has several institutions of higher learning, at which about 150 students attend. Telephones, electric lighting and waterworks are among the facilities. Population, 1918, 6,982.

REINDEER (rān'dēr), a species of mammals of the deer family, native to the northern regions of Europe and Asia. It has long been domesticated in Scandinavia, especially among the Laplanders, and in the northern parts of Asia, but is still found in the wild state in Spitzbergen and other sections of the far north. The reindeer differs from the common deer in being less gracefully formed, in having stouter limbs, and in carrying its head less elevated. The antlers of the male are much larger than those of the female and the upper parts are palmated or branched. A marked difference is noticeable in the size of reindeer, this depending largely upon latitude, the larger species occurring in the regions farthest north. The usual height when full grown is about four and a half feet, the color is brownish-yellow in winter and grayish-white in summer, and the horns are shed every year. The reindeer is valuable because of its flesh, hide, and milk. Large herds are reared in many sections of Northern Eurasia, in Greenland and Iceland, and in several localities of North America. They are used as saddle and pack animals in Kamchatka, but serve chiefly for draught purposes. A single reindeer is capable of moving 200 pounds at the rate of from eight to ten miles per hour and can endure work for a considerable time. The reindeer native to North America is the caribou, which includes several species differing but slightly from those of Eu-Reindeer moss is a form of lichen of

on following page. RELATIONSHIP (re-la'shun-ship), the relation that exists between two persons on account of marriage or ancestry. The relationship between husband and wife, as well as that of others through marriage, is known as affinity, while that due to the descendence from the same ancestors is called consanguinity. The latter may be either lineal or collateral. By lineal consanguinity is meant the direct descent from one to another, as from father to son or grandson, while collateral consanguinity refers to those who descended from common ancestors, as the children of two brothers, who are cousins in relation to each other. In law, the kindred of the wife by blood are related to the husband by affinity, her brothers and sisters being respectively the brothers-in-law and the sisters-in-law to the husband. The relationship of children of cousins, popularly called second

much importance because of its value as food

for the reindeer, but these animals also feed

on other forms of vegetation. See illustration

cousins, is not recognized in the law of most countries. Relationship by affinity and consanguinity bars service as judges or jurors in the trial of causes, and in some countries the marriage of cousins is not permitted.

RELATIVE RANK (rěľá-tív), a term used in the army and navy to signify the precedence of officers. The following list indicates the relative rank of combatant army officers and their equivalent in the navy:

ARMY.	NAVY.
	Admiral
	Vice Admiral
	Rear Admiral
	Commodore
	Captain
	Commander
	Lieutenant Commander
	Lieutenant
	Lieutenant (junior grade)
Second Lieutenant.	 Ensign

RELIGION (rē-lig'ŭn), the reverent feeling by which men indicate their recognition of the existence of a Supreme Being, to whom they attribute power over their destiny and render obedience, service, and honor. The religious feelings are experienced only in beings that possess advancement in intellectual and moral faculties to a moderately high degree. Religion differs from morality in that it denotes the influence and motives of human duty found in the character and will of God, while morality is concerned with the duties that one individual owes to another, but in their fulfillment true religion is a potent influence. As distinguished from theology, religion is subjective, in that it designates the feelings and acts of men relating to God, while theology is objective, denoting the beliefs and ideas that man entertains in respect to the God whom he worships according to the nature of his views. Darwin considers the feeling of religious devotion to be highly complex, since it in-

cludes love, complete submission, dependence, reverence, gratitude, fear, and hope for the future. On the other hand, Max Müller regards religion a mental faculty that enables man to apprehend the Infinite under different names, even without the exercise of reason, and regards it as a mark of broad distinction between man

and the lower animals.

The term religion is likewise employed to imply forms of doctrines that have come down to the present time by tradition or in canonical books. When used in this sense, it extends to the different religious forms supported by people in all states of society, from the savage to the highly civilized, though the many different forms may be quite accurately divided into two general classes, the polytheistic and monotheistic. Those grouped under the former are systems that recognize a plurality of deities, while those belonging to the latter class recognize but one, an ever-existing, unchangeable, almighty God (q. v.). It may be said that all forms of religion are historically connected and related to each other, and have influenced one another in various ways that can be discovered quite easily by the study of history. Like the history of art, industry, science, and society in general, religion has been a process of development in which each stage has proceeded gradually from antecedent factors and conditions. However, it is not studied entirely from a historical standpoint, but in its unity and entirety, with a view to learn of its essence and all its



REINDEER.

essential relations. In this aspect it comprehends the philosophy of religion, and in an independent form it could not have been studied appropriately until both philosophy and theology were highly developed.

Writers have made various estimates of the different religious creeds supported in the world, but all of them are only approximately correct. The following table is taken from the most recently published reports, which place the entire number of religious worshipers at 1,490,464,202, as follows:

CHRISTIANS.	NON-CHRISTIANS.	
Church 98,016,000 Church of Abyssinia 3,000,000 Armenians 2,690,000	Hindus	

RELIGIOUS LIBERTY, the freedom of religious opinion, the equality of all churches, or the right of every individual to worship according to the dictates of his own conscience. It is the purpose of civil government to neither support nor hinder any form of religion, but it is charged with the duty of preventing excesses and encroachments upon private rights. While injuries are not to be inflicted on account of religious belief, special privileges are not to be granted to any class of individuals or religious associations. The state is limited to the overt act, while religion takes an account of the attitude of the mind or soul.

Ancient nations had no conception of religious liberty, but instead treated as disloyal those who preferred not to worship at the shrine of the altars set up by a system of state religion. Gradually the public mind became more tolerant, but it again relaxed in the early centuries of the Christian era, when the spread of the religion of Christ was looked upon as an interference with existing governments. Emperor Constantine, after his conversion, established Christianity by law, in 313. This may be looked upon as an unfortunate event in the history of religion, since it was the forerunner of allying religion with civil authorities in many nations, which has not been entirely overcome up to the present time. In the early history of the Roman Catholic Church it subjected governments under its authority, or formed alliances with civil powers. Although the Ref-ormation was not entirely tolerant, it may be said to constitute the forerunner of religious liberty in the world. Freedom of worship is now generally permitted in the nations of the world, but some give aid and support to certain denominations. However, the tendency is toward absolute liberty in regard to freedom of conscience and worship.

REMBRANDT (rem'brant), Hermensz

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city, but in 1630 removed to Amsterdam, where he had studied art a number of years before. His numerous etchings and paintings are among

the most excellent of the Netherlands, and he became the master of a number of skilled painters. Many of his productions are still extant, including portraits, landscapes, and genre and historical subjects, and besides these he produced about 375 etchings of merit. The excellent coloring, expression, blending of light and shade, and superior composition of his works show that he was not only original in devising, but that he possessed the peculiar skill and industry necessary to bring out the best results that can be obtained by perseverance. A classification of his paintings recently made includes 280 different titles, many of which are valued highly. Among his most noted are "Jesus Healing the Sick," "Jesus Before Pilate," "John the Baptist Preaching," "Simeon in the Temple," "The Wife of Samson," "The Descent from the Cross," and "Samson in Prison." His miscellaneous paintings include "A Lesson in Anatomy," "The Night Watch," "Portrait of Jan X.," "The Syndics of Amsterdam," and "The Burgomaster and His Wife."

REMENYI (re'mān-ye), Eduard, violinist, born at Heves, Hungary, in 1830; died in 1898. He studied under Joseph Böhm in the Conservatory in Vienna, but took part in the Revolution of 1848 against Austria, on account of which he was compelled to leave the country. The following year he came to the United States, but went to Weimar, Germany, in 1853, and later settled in England, where he received an appointment under Queen Victoria. The general pardon of 1860 permitted him to return to Hungary, after which he traveled as a musician in Canada, Mexico, China, and the leading countries of Europe. His death occurred in California while he was touring the United States. He ranked among the leading musical artists of his time.

REMINGTON (rem'ing-tun), Frederic, artist, born at Canton, N. Y., Oct. 4, 1861; died Dec. 26, 1909. He studied at the Yale Art School for two years and for some time lived on a ranch in Montana and later in Wyoming. While associated with the ranchers and cowboys he gathered many sketches in connection with the Indians and men of the plains. In 1884 he began to contribute to several magazines and later furnished the illustrations for several articles written by Theodore Roosevelt. His paintings include "The Dash for the Timber," "Conjuring the Buffalo Back," and "The Bronco Buster."

REMSEN (rem'sen), Ira, chemist, born in New York City, Feb. 10, 1846. In 1865 he completed by graduation a course of study in the College of the City of New York, attended the New York College of Physicians and Surgeons, and afterward studied at the University of Göttingen, Germany. He was assistant professor of chemistry at the universities of Munich, Tübingen, and Göttingen from 1870 to 1872, and in the latter year was made professor of chemistry and physics at Williams College. He became professor of chemistry at Johns Hop-

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kins University in 1876 and succeeded Dr. Gilman as president of that institution in 1901. Besides publishing many text-books, he made a number of original investigations in organic and inorganic chemistry. In 1879 he founded the American Chemical Journal, of which he was editor a term of years. Among his publications are "Organic Chemistry," "Elements of Chemistry," "Principles of Theoretical Chemistry," and "Introduction to the Study of Chemistry."

REMUSAT (rā-mü-zà'), Charles François, statesman and philosopher, born in Paris, France, March 14, 1797; died June 6, 1875. He was educated at the Lyceé Napoleon and soon after engaged in journalism. In 1818 he became closely connected with the party leadership of Guizot, and published a pamphlet of considerable merit on "Trial by Jury." He became a contributor to the Globe in 1824 and in 1830 entered the French chambers as deputy, in which he was an influential member until 1848. His support was given to the ministry of Casimir Perier and, when the government passed to Thiers, he became minister of the interior. Louis Napoleon exiled him when he ascended the French throne in 1851, and while abroad he gave his attention to literary and scientific studies, but when Thiers became president, in 1871, he was called to the portfolio of foreign affairs, in which he served with distinction until 1873. He is the author of a number of excellent works on scientific subjects, the most noted production being his "Essays on Philosophy."

RENAISSANCE (re-na-sans'), or Revival of Learning, the name used to designate an indefinite space of time in the development of culture and learning in Europe. In this sense it denotes the transition from the period of history known as the Middle Ages to that of modern civilization. Sometimes the term, which signifies literally a revival or new birth, is applied to the period commencing with the 14th and ending with the first half of the 16th century, which witnessed the revival of classical literature and the fine arts of the Western nations. It is true that the Middle Ages had a culture and civilization peculiar to that period, but the public mind was more or less stagnant and learning was confined almost entirely to the clergy. While the defects of former periods were remedied, the best of the preceding civilization was made a part of the Renaissance. It signifies the entrance upon a fresh stage of vital energy in general, implying a fuller consciousness and a freer exercise of faculties that had belonged to the mediaeval period. Though in large parts contemporary with the Reformation, it is not to be confounded with the latter movement, which was concerned more specifically with a series of events and group of facts.

RENAN (re-nan'), Joseph Ernest, historian and essayist, born in Tréguier, France, Feb. 27, 1823; died in Paris, Oct. 2, 1892. He first attended school in his native town, but in 1839 en-

tered the Seminary of Saint Sulpice, Paris, where he studied for holy orders in the Catholic Church. In 1845 he abandoned his former view to become a priest, but continued to pursue the study of Hebrew, German and other languages with untiring energy. He was granted a prize in 1848 for a memoir on the Semitic languages In 1849 he was sent on a literary mission to Italy, and in 1856 became a member of the Academy of Inscriptions. His next recognition came in the form of an appointment to study Phoenician civilization by making a tour of Syria, when he visited various parts of the Holy Land, which enabled him to publish his work entitled "Life of Jesus." In this he expressed skeptical views in relation to many accepted traditions, which caused public opinion to turn against him to such an extent that he had to abandon his professorship of Chaldee, Syriac, and and Hebrew in the College of France, to which he had been elected in 1862. In 1871 he was restored to that position. He became a member of the French Academy in 1878, received the cross of the Legion of Honor in 1880, and was made grand officer in 1888. The works of Renan are very numerous, though his "Life of Jesus" is the best known and has been translated into many languages. Other works include "History of Israel," "History of the Origin of Christianity," "Recollections of My Youth," and "Influence of the Thought and Culture of Rome on Christianity."

RENNES (ren), a city of France, formerly the capital of Brittany, at the confluence of the Ille and Vilaine rivers, 190 miles southwest of Paris. It is on both sides of the Vilaine River, which is crossed by a number of stone and steel bridges. Among the noteworthy buildings are a cathedral of modern Grecian construction, the palace of justice, a number of fine schools, several hospitals, and a university. The manufactures include shoes, sailcloth, cotton and woolen goods, yarn, lase and a speed it compreseity is surroutphy of religion, and in an ining wheat, ryelit could not have been studied road facilities il both philosophy and theology is well fortific loped.

ulation, 1916, made various estimates of the RENO (screeds supported in the world, seat of Washoare only approximately correct. the western pable is taken from the most re-Carson City. reports, which place the entire the Southern us worshipers at 1,490,464,202, fornia and Ord

cipal buildings
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pital for Men 300,000 Hindus 210,000,000 Hindus 250,000,000 Girls, and several merchandise. The surrounding country is devoted to farming, mining, and stock raising. It was settled in 1868 and the present charter as a city dates from 1903. Population, 1900, 4,500; in 1910, 10,867.

RENSSELAER (rěn'sē-lēr), a city of New York, in Rensselaer County, on the New York Central and the Boston and Albany railways. It is situated on the Hudson River, opposite Albany, with which it is connected by several bridges. The surrounding country is agricultural and dairying. It has several fine school buildings and churches, and carries considerable trade in produce and manufactures. Electric lighting, pavements, and electric railways are among the public utilities. It has extensive railroad machine shops, lumber yards, roundhouses, and freight yards. It was incorporated as the village of Greenbush in 1815 and was chartered under its present name as a city in Population, 1905, 10,715; in 1910, 10,711.

RENT, the compensation paid for the possession and use of land, houses, or property of any The term is applied in an economic sense only to the annual payment made for the use of lands employed in producing such wealth as it yields by tilling. In this sense it attaches to and proceeds from things fixed or immovable. It is paid either in money at a fixed amount annually, or by giving a share of the crops produced. The rate of rent accruing to a landlord may be said to be fixed by free competition, since the character of the work done by the tenant and the rate offered for possession determine largely what particular person may occupy the land. Rents depend chiefly upon fertility of the soil, facility or difficulty of cultivation, and situation as to an available market.

That the highest rent may be secured for lands of fertile soil is quite apparent, but it is likewise important that it be of such a character as to render cultivation reasonably easy, otherwise the extra expense for machinery and labor renders production more costly and the profits correspondingly less. Proximity to market is a very important factor, since thereby the capabilities of the soil can be more easily utilized. Besides, the cost of transportation to a distant market materially reduces the profit and renders it less easy to place the products for sale at the most opportune time. The factor of maintaining virgin fertility of the soil is also taken into account and even enhancing its productiveness, which is always facilitated by nearness to a large city, through enlarged consumption on the farm, or by returning to the land an equivalent for what is produced. In many cases the productive quality of the soil has been increased two, five, or even tenfold by tilling, careful cultivation, and the addition of manures hauled from the cities.

RENWICK (ren'wik), James, physicist, born in Liverpool, England, May 30, 1790; died Jan. 12, 1863. He descended from Scotch parentage, studied at Columbia College, New York City, and became an instructor in philosophy and chemistry in that institution. In 1820 he was called to the chair of these sciences. The government of the United States appointed him

as one of the commissioners to explore the boundary between that country and New Brunswick, in which capacity he served in 1838. For some years he was a trustee of Columbia College. His books include "Chemical Philosophy," "Treatise on the Steam Engine," "Elements of Mechanics," "Life of John Jay," "Chemistry Applied to the Arts," and "First Principles of Chemistry."

REPPLIER (rep-pler'), Agnes, authoress, born at Philadelphia, Pa., April I, 1855. She descended from French parentage, studied at the Sacred Heart Convent, Torresdale, Pa., and later at the University of Pennsylvania. At various times she traveled as a means of gathering material for her literary work. She contributed extensively to magazines, such as the Atlantic Monthly and became popular for the delightful style and witty irony of her writings. Her books include "Points of View," "The Place and the People," "Essays in Idleness," "Books and Men," "Book of Famous Verse," and "In the Dozy Hours, and Other Papers."

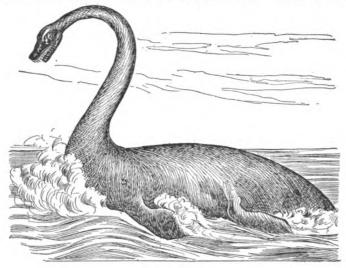
REPRIEVE (re-prev'), the postponement of the execution of a sentence imposed by a court of record. A suspension of this kind may be granted by the executive of a state or nation, or by the Judge of such a court. However, in some instances the right to grant a reprieve or a pardon is vested in the board of pardons, subject to the approval of the chief executive. Reprieves are granted for various causes, including an opportunity to investigate the legality of the conviction, the sudden insanity of the prisoner, and favorable indications in the prisoner that may appear to justify a postponement of the execution or the commutation of the sentence.

REPTILES (rep'tilz), a class of cold-blooded air-breathing vertebrates. They are classed as occupying a place in the animal kingdom between birds and amphibians. The body is generally elongated, terminating in a long tail, and the skin in most species is covered with scales or scutes. They are distinguished from the amphibians in that they breathe air through lungs during the whole period of their lives, and from birds in having scales, instead of feathers, and cold blood. Like birds, many species of reptiles are oviparous, that is, their young are produced from eggs incubated outside the body; while some are ovoviviparous, producing eggs that are incubated or hatched within the parent's body. Most species have four limbs, which are barely long enough to keep the body from the ground, but many are without limbs, as the serpents and some of the lizards. When present, the limbs have many carpal and metacarpal bones.

Reptiles are now classed in ten orders, six of which are extinct. The four represented by living forms include the Lacertilia, Crocodilia, Ophidia, and Chelonia. The order of Lacertilia includes the lizards, chameleons, and blind-

worms; the *Crocodilia* embraces crocodiles, alligators, and gavials; the *Ophidia* includes the snakes; and the *Chelonia* comprises the turtles and tortoises. All the turtles and tortoises have a round body, which is covered by a hard shell, and they are characterized by a long tail. The senses are more highly developed than those of fishes, but duller than in birds and mammals. Nearly all are slow in their movements, but, as they bear more bruising than other animals, their life is less easily destroyed. Most species of reptiles are flesh eating. Snakes swallow their food whole, the stomach and gullet being capable of great distension, while crocodiles and tortoises masticate quite carefully.

In some cases, as in the python, the eggs are hatched by the warmth of the body, but they



PLESIOSAURUS.

are mostly laid in the warm sand to be hatched by the sun, or by the warmth of decaying vegetable matter. Reptiles are most numerous in warm climates, where they attain their greatest size. Some are aquatic, as certain snakes, crocodiles, and tortoises, and others live in trees or burrow in the ground, as the lizards. They generally hibernate in winter, or the cold season. The crocodiles and alligators are the largest living reptiles, and the structure of the vital organs most nearly resembles those of the birds. Snakes are peculiar for shedding the skin periodically. About 2,000 species of reptiles have been enumerated

The reptiles antedate the Permian period. This is evidenced by the remains of these animals found in the Permian rocks of North America and Europe. Indeed, the living representatives are insignificant as compared with the vast multitude of large reptiles which are known to have lived in the ages of the remote past. They included both marine and land forms of large size, including vegetable feeding as well

as carnivorous animals, some of which suggest the present snakes, porpoises, whales, and sloths. The *plesiosaurus*, an extinct marine reptile with a long neck, a small head, and paddles for swimming, is a type of the Mesozoic age. Others include the *ichthyosaurs*, the *pterodactyls*, and the *dinosaurs*.

REPUBLIC (rê-pub'lik), the form of government in which the sovereignty is vested in the people, the administration being lodged in officers who are elected by, and directly represent, the people. The element of democracy is necessarily included in the management of a republic, since the extension of suffrage to the people is democratic, while the representative feature in law-making and law-executing is the republican element. The government of the

United States is democraticrepublican, but it is generally known as a republic. In reality there are two distinct classes of governments in most republics, known as State and Federal. Before the thirteen original states ratified the Constitution each possessed an independent national sovereignty. When it entered the Federal Union it became subject to the general Constitution, but it retained a dependent republican government. The nation is bound to preserve the right of republican government in each of the states, an obligation laid upon it by the national Constitution. Thus, each State has a constitution more or less similar to that of the other states, and is dependent upon and limited by the Constitution of the

Federal government.

Republics had their origin in the opposition that prevailed against hereditary monarchies, as was the case in Greece, Rome, and most countries of North and South America. The essential features have continued to be principally the control of the chief executive by elections and in laws emanating from assemblies chosen by an enfranchised class. In ancient Greece the government of the small states partook of the nature of a democracy, where the whole body of citizens met to enact their laws, while the republics of Genoa, Venice, and others of mediaeval Italy partook of the nature of an oligarchy, since the right of suffrage was vested almost entirely in the nobles and a few privileged individuals. The representative form prevails in all modern republics. Nearly all have a written constitution. They vest the right of suffrage in the male citizens. In most cases they choose the chief executive indirectly, some through an electoral college, as in the United States, or by the legislature, as in France and

Switzerland. The legislative authority is generally vested in an assembly of two chambers or houses, and the judiciary has power to pass upon the constitutionality of the laws and executive acts.

Switzerland and France are the only powerful republics of Europe, but there are three others -Andorra, Monaco, and San Marino. The last named is the oldest republic in the world. It is situated on the Italian coast of the Adriatic Sea and dates from the 4th century. France was a republic at three different periods, in 1793-1804, in 1848-1852, and from 1870 to the present time. The seven provinces of Holland organized a republic at the time of their separation from Spain and maintained it until 1815. The government of England was a nominal republic from 1649 to 1660, and Spain was so governed at two periods-in 1868-69 and in 1873-74. In 1776 the American colonies declared their independence, but the United States was not organized as a constitutional republic until 1789. Mexico obtained its republican government in 1824, which it has ever since possessed, except in the brief period of Maximilian's reign, from 1863 to 1867. All the independent countries of America are now republics, Brazil obtaining that form of government in 1889. At present there is a marked tendency toward the establishment of republics, or toward limiting the power of monarchies by constitutions. It is not at all improbable that the present century will witness the establishment of republics in many regions governed at present by powerful monarchies.

REPUBLIC, Grand Army of The. See

Grand Army of the Republic.

REPUBLICAN PARTY, the name first applied to the party formed by Jefferson in opposition to the Federalists, which assumed the name as an advocate of a republic, while its opponents were classed as Monarchists. However. the name soon gave way to that of Democrat, chiefly because the party advocated vesting large powers in the people. The present Republican party was not organized until in 1854. It was formed by a union of smaller parties and factions that left the Whigs and Democrats on account of various phases of the slavery question. It may be said that the Whig party was disrupted by the compromise of 1850. In 1854 the Democrats passed the Kansas-Nebraska Act, which was immediately followed by a union of various elements that united in opposition to that measure, among them the Know Nothings, Abolitionists, Free Soilers, Whigs, and numerous Democrats. The party was first known as anti-Nebraska men, but soon assumed the name of Republican and won a plurality in Congress. In 1856 the first national convention was held in Philadelphia, which nominated Fremont and Dayton for President and Vice President. The platform adopted by this convention declared against the repeal of the Missouri Compromise, opposed the extension of slavery to the territories, and advocated the admission of Kansas as a free State and the construction of a railroad to the Pacific. In the campaign "Free soil, free speech, free men, Frémont" became the rallying cry, and, though overwhelmingly defeated, the party elected 92 out of 237 Congressmen.

Thousands of voters broke away from the Democratic party on account of the Dred Scott Decision and the Lecompton Bill, and the division of that party in 1860 brought about the election of Abraham Lincoln. The first election of a President by the Republicans hastened on the Civil War, but before 1864 a split occurred in the party, the dissenting faction nominating John C. Frémont for President at a convention in Cleveland. However, the Republicans temporarily assumed the name of the National Union party, renominated Lincoln, and placed Andrew Johnson, a Democrat, on the ticket for Vice President. The latter succeeded to the Presidency in 1865, owing to the death of Lincoln, and immediately the question of reconstruction began to agitate the nation. The Fourteenth Amendment, the civil rights bill, the reconstruction bill, the Freedmen's Bureau Bill, and the tenure of office act were passed. President Johnson's opposition to a number of these measures caused his impeachment, but he was not convicted.

A new class of leaders arose with the election of General Grant, in 1868, among them Sherman, Blaine, Conkling, Edmunds, and Allison. President Grant was reëlected for a second term and was followed successively by Hayes and Garfield. The latter dying in office, he was succeeded by Chester A. Arthur. In 1884 the nomination of Blaine caused a division of the party in New York and other eastern states, thus assuring the election of Grover Cleveland, the Democratic candidate. However, Benjamin Harrison was elected in 1888. He was defeated when a candidate for reëlection, in 1892, by his Democratic opponent, Grover Cleveland. The party elected William Mc-Kinley in 1896 and reëlected him in 1900. After his assassination in 1901, he was succeeded by Theodore Roosevelt, who was elected President in 1904. William H. Taft was elected in 1908, defeating W. J. Bryan, but he was defeated in 1912 by Woodrow Wilson.

The Republican party has always depended for its strength upon the North and West, though in 1896 it lost practically every State west of the Missouri. Like all other parties, its positions have been modified by the character of national events, but it has been constant as an advocate of national banks, a high protective tariff, and internal improvements during its entire existence. Among the positions taken on questions already settled or now in a state of discussion are those including opposition to the extension of slavery, in favor of a

vigorous prosecution of the Civil War, the Emancipation Proclamation, the demonetization of silver in 1873, the resumption of specie payment in 1879, a general increase in pensions, the acquisition of territorial possessions in regions remote from the United States, and an increase in the standing army. The period of American history during which the Republican party controlled the executive branch of the government is forty-four years. See Political Parties in the United States.

REPUDIATION (re-pū-dǐ-ā'shun), the rejection of the whole or part of a contract, debt, or obligation. The several states are limited by the Constitution in that they may not pass laws to impair the obligations of contracts, but the Eleventh Amendment provides that the Federal Supreme Court has no jurisdiction of suits brought against a State by a citizen of another State. Hence, states have been at liberty to either repudiate or acknowledge debts, but acts of repudiation have occurred generally only on grounds of unlawful or fraudulent transfer coupled with failure of consideration. This was the case in 1841, when Mississippi repudiated bonds issued to railroad companies. which failed to comply with the conditions on which they received them. Among the other states repudiating at various times are Georgia, Alabama, Louisiana, Minnesota, Florida, Michigan, Tennessee, Arkansas, Virginia, and the Carolinas, though in some states bills were passed to refund the debts.

RESACA DE LA PALMA (rå-sä'kå då lä päl'mà), Battle of, an engagement of the Mexican War, fought on the plains at Resaca de la Palma, in Cameron County, Texas, on May 9, 1846. The Americans under General Taylor had an army of 2,300 men, while the Mexicans under General Arista numbered about 5,000. The center of the battle was in a ravine covered by a thick growth of timber, and the day was won for the Americans by a charge of dragoons. Both sides lost heavily.

RESERVATION (rez-er-va'shun), a tract of land set apart by the government for public uses or for special purposes. A large number of reservations have been made in different parts of the country for divers purposes, such as providing sites for forts and government buildings, preserving tracts for the forests, and retaining scopes of country for the special use of the Indians. The most extensive reservations in the United States are the Yellowstone National Park and the tracts set apart for occupation by the Indians. Canada has many forest preserves and Indian reservations.

RESERVOIR (rěz'ēr-vwôr), the term applied to any receptacle for storing up a fluid, but employed most extensively in describing an artificial basin to retain water until it can be used in economic and industrial enterprises. Reservoirs are divided into several classes, of which the more important are for storage, im-

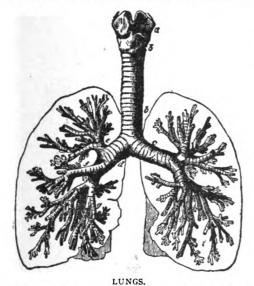
pounding, settling, and distributing purposes. In many cases great engineering skill is required to plan the constructions of basins of this kind, since the pressure is an item to be considered, as well as freezing, flooding, and influences exercised by overflows.

Storage reservoirs are frequently formed by constructing a dam across some stream, but in many instances they are made either in part or wholly by excavations and embankments. To this class belong the great reservoirs connected with the Croton dam of New York City, which serves in supplying the city with water. It has a capacity of about 35,500,000,000 gallons. The Wachusett dam of Boston retains about 63,-000,000,000 gallons; the Periyar dam of India, 100,000,000,000 gallons; and the Assuan dam of the Nile, about 280,000,000,000 gallons. These dams provide storage reservoirs of greater capacity than any others in the world. Impounding reservoirs are constructed by building a dam across some stream, the purpose being to flood the country above. Settling reservoirs are maintained to purify the water by aerating and permitting the mud to settle. Distributing reservoirs are comparatively small and serve to retain a supply of water in different parts of the city. Formerly the construction was largely of stone, but cement and concrete are the principal materials used in building reservoirs at present.

RESINS (rez'inz), a class of vegetable substances, being the product of oxidation of volatile oils secreted by certain plants. They are hard or soft according to the amount of oil they contain and the length of time they have been exposed to the air. Resins are either transparent or translucent, are somewhat elastic, and generally are soluble in alcohol, but insoluble in water. The resins are divided into three general classes, including those obtained from fossils, those extracted from plants by alcohol, and those exuding from plants spontaneously. Those obtained from fossils are derived from amber, coal, asphalt, and lignite; those extracted from plants by alcohol embrace such as the resins of angelica root, which generally contain definite carbon compounds; and those that exude from living plants include benzoin, Peru balsam, turpentine, lac, myrrh, copal, jalap, and storax. The last mentioned resins are obtained by making incisions in the stems and branches of plants, but in some plants they form drops of tears naturally. Many of the resins are used in medicine and mechanic arts, and are sold extensively as commodities in the trade.

RESPIRATION (res-pi-rā'shūn), the process of breathing, which consists of two acts: taking in the air, or inspiration, and expelling the air, or expiration. It is partly nutritive and partly excretory in its character, since it revives the blood by taking in oxygen and casts out waste products in the form of carbonic acid. Besides carbonic acid, there is a quantity

of water and organic matter given out by the breath, which may be seen more or less clearly by breathing on a glass or windowpane at low temperature. Respiration is carried on in man and the higher animals mainly by the lungs. The air enters into the mouth or nose, passes through the larynx, a kind of hollow chamber extending from near the root of the tongue to the trachea, or windpipe, whence it passes into the lungs through two bronchial tubes. On entering the lungs the bronchial tubes divide and subdivide, usually by twos, into smaller tubes called bronchi, and the whole appears like a tree with many branches. The larynx is a framework made up of cartilages held together by small ligaments, and forms the projection called Adam's apple. An elastic plate called the epiglottis is at the upper opening of the



Distribution of Air tubes in Mammalian Lungs. a, larynx; b, b, trachea; c, d, left and right bronchial tubes; e, f, g, the ramifications.

larynx, which closes down over its entrance while swallowing, thus preventing the admission of food substances into the bronchial tubes.

The tubes in the lungs terminate in minute air cells, which are inclosed by transparent and very thin walls, and through them ramify minute blood vessels, lymphatics, and nerves. As the air enters the lungs, the diaphragm, a thin partition between the chest and the abdomen, is lowered, while the ribs are raised, thus increasing the size of the chest. Thereupon, the elastic lungs expand to occupy the extra space, while the air rushes in through the windpipe and pours along the bronchial tubes, crowding into every cell. The operation is reversed when the air is expelled. The walls of the abdomen are drawn in, the diaphragm is pressed upward, and the ribs are pulled downward, thus diminishing the size of the chest and forcing

the air outward. Ordinarily breathing is done mainly by moving the diaphragm. It takes place about eighteen times per minute during the waking hours, or at the rate of one breath to every four beats of the heart. The lungs of a healthy adult have a capacity for about 330 cubic inches of air, and in ordinary breathing about thirty cubic inches pass in and out, though it is possible to take in fully 100 cubic inches in a deep inspiration. A quantity of air is always in the lungs. The constant supply is equal to about 100 cubic inches, this being important for the reason that the action of the air goes on continuously.

In the process of breathing the blood comes in contact with the air as it is pressed into the air cells of the lungs, where it takes up the oxygen and in turn gives up carbonic acid gas and other impurities taken up in its circulation through the body. By this process it is changed from dark blue to a bright red color. Thus purified and laden with the inspiring oxygen, it goes bounding through the system, while the air we exhale carries off the impurities. If respiration is interfered with, the arteriai blood becomes dark like that of the veins, and, when death takes place by asphyxia, as it does when respiration is impeded, the body assumes a very dark color. Foul matter passed off from the lungs diffuses itself through the surrounding atmosphere, and, if good ventilation is not provided in rooms occupied by a number of persons, the air becomes largely poisoned by impurities. As a result the system suffers from a lack of oxygen, which is speedily followed by drowsiness, headache, catarrh, and finally by serious and fatal diseases.

Respiration in fishes is carried on by the gills, the water inhaled giving up oxygen, while that exhaled carries off nitrogen and other impurities. The reason that fishes cannot long endure in stagnant water is that oxygen is rapidly consumed in the process of breathing; thus, it becomes necessary to frequently replace water in vessels where fish are kept. No special apparatus is provided for the aëration of fluids in the body of the lowest and simplest forms of animals, this being effected by the general movements of the body, or by cilia producing the necessary currents. Some animals are incapable of breathing either air or water, and in such the process is carried on by the skin or through small sacs at regular intervals on each side of the body, as in the leech and earthworm. Respiration is carried on in insects by spiracles opening into tubes, which communicate with each other through the body. Plants have a respiratory process somewhat similar to that of animals, but they take in carbonic acid as the vital element and exhale oxygen, thus reversing the action of the animal. However, the normal respiration in plants takes place only in the presence of light. Thus, it will be seen that nature has provided elements alike

essential to both forms of life, and that each is dependent at least to some extent upon the other

RESTIGOUCHE (res-ti-goosh'), a river of Canada, in the northwestern part of New Brunswick, forming a part of the boundary between that Province and Quebec. It rises in Madawaska County, whence it flows toward the northeast, discharging into Chaleurs Bay. The Patapedia, the Matapedia, and the Upsalquitch are its principal tributaries. It has a total length of 200 miles, of which about half is navigable for small boats, while the largest vessels ascend a distance of twenty miles.

RESURRECTION (rez-ur-rek'shun), the awakening or raising of mankind immediately preceding the last judgment. The doctrine of the resurrection is maintained by all Christians and in some form it is supported by the Jews and Mohammedans. The Zoroasterians taught it definitely and it was suggested by the teachings of Plato and in the mysteries of the Egyp-This doctrine was a fundamental belief of the Pharisees, but was disputed by the Sadducees. Christ and the apostles revealed it in the New Testament.

The Christian churches base their belief in this doctrine upon the resurrection of Christ. It is recorded that he rose on the third day after death, when his body was identical to it at the time of the crucifixion, except that it was changed as to its mode of being. Accordingly, it is held that all the dead are to rise on the last day to be judged according to the deeds done in this life, after which the good are to enjoy bliss and the bad are to undergo punishment. Most of the fathers of the church believed in the resurrection of the flesh, but later a distinction was made between the flesh and the body. Origen reaffirmed a distinction between the resurrection of the body and the flesh, referring to the former as the essence and to the latter as the phenomenal form. This view was generally held by the reformers, who looked upon the body as the creature of God, the redeemed by Christ, and the temple of the Holy

RESZKE (resh'ke), Jean de. See De Reszke, Jean.

RETAINER (re-tan'er), a fee paid to an attorney or councilor at law, or the employment of an attorney to prosecute or defend a cause. A retainer may be either in writing or in the form of a verbal request. One employed in this manner is authorized to represent a client in a suit, under such rules and regulations as may be in use in the court. A retainer, or a retaining fee, is sometimes paid to an attorney with the understanding that he will hold himself in readiness to represent the applicant in the court, although the arrangements to do so are to be made at some future time.

RETIREMENT (re-tir'ment), the act of retiring a military or naval officer from active duty, especially where such an officer has reached the age at which active service is limited. Such limits are recognized in all the leading nations and the officers who thus retire in most cases receive a regular salary and an increase in rank. Great Britain permits voluntary retirement with gratuities or pensions, but requires such retirement when the age limit is reached. In the United States the navy officers retire at 62 and the army officers at 64 years, but the President may retire an army officer at 62. Officers who are on the retired list in the United States receive 75 per cent. of the pay of their rank.

RETORT (rê-tôrt'), a vessel used for the decomposition of compound bodies by heat, or for distillation. The retort of the chemical laboratory is of glass, platinum, porcelain, or other material. It consists essentially of a bulb with a long neck attached, in which the products of distillation are condensed, and from it they pass into the receiver. Retorts are of various shapes and the materials from which they are made differ somewhat with the uses they are to serve. Where a high degree of heat is necessary, iron or metal retorts are used, since glass and many other substances are not proof against a high temperature.

RÉUNION (rê-ūn'yŭn), or Bourbon, an island in the Indian Ocean, situated between Madagascar and Mauritius. It is about 35 miles long and 22 miles wide. The area is 780 square miles. The island is of volcanic origin, but the summits are now extinct, except Pition de la Fournaise, which is active. The surface is mountainous, ranging from 2,000 to 10,065 feet. which is the height of Pition des Neiges, the culminating peak. Much of the surface is fertile, especially along the coast and in the valleys. Sugar, coffee, vanilla, timber, and tropical fruits are the principal products. The in-habitants consist chiefly of Africans, Chinese, and natives. Portuguese navigators discovered the island in the 16th century, but it became a possession of France in 1649. It is governed under the municipal code of France. The executive power is vested in a governor, who is assisted by a privy council. Population, 1908, 175,240.

REUTER (roi'ter), Fritz, novelist and poet, born in Stavenhagen, Germany, Nov. 7, 1810; died in Eisenach, June 12, 1874. He studied under private tutors until 1832, when he entered the University of Jena, and in 1833 engaged in revolutionary agitation against the Prussian government. This brought about his arrest for high treason, and, after a trial, he was condemned to death, but the sentence was commuted to imprisonment for thirty years by Frederick William III. He was set free in 1840 by an amnesty issued when Frederick William IV. ascended the Prussian throne, and henceforth gave his entire attention to literature. His writings are realistic in character, dealing mostly with the actual conditions of life, and many of them are remarkably popular on account of the happy manner in which he describes incidents and circumstances with which he met. Most of his poems and some of his novels are written in the *Platt-Deutsch* dialect. "My Prison Days" and "In the Year 113" are his best known works.

REVAL (rev'el), or Revel, seaport of Russia, capital of Esthonia, on the Gulf of Finland. It is 200 miles southwest of Saint Petersburg, with which it is connected by railroads. Among the noteworthy buildings are the townhall, the central railway station, the capitol building, the merchants' exchange, and three gymnasiums. It is popular as a summer resort for boating and bathing. The city has a system of waterworks, the supply being carried from Lake Jarvakyla by an aqueduct. It has manufactures of machinery, clothing, cotton and woolen goods, utensils, and cordage. The harbor of Reval, which remains open throughout the year, has a large commerce. The Germans captured Reval by a combined land and sea attack in 1918. Population, 1914, 99,685.

REVELATION (rev-e-la'shun), Book of, the name of the last book of the New Testament, which is sometimes called the Apocalypse of Saint John. It has been the subject of more or less discussion, since both the authorship and the date of its composition are uncertain. Issued at a time when religious persecutions were practiced, it was probably written in opposition to the practices of the Roman Empire, but at the same time to encourage the faithful to persevere until the coming of judgment and the deliverance. In the first part are letters written to seven Christian churches in Asia Minor, which are followed by visions and prophecies relating to the fall of Jerusalem, the power of the world that opposes Christ, and the glory of the heavenly and eternal Jerusalem. See Apocalyptic Number.

REVERE (re-vēr'), a town of Massachusetts, in Suffolk County, a short distance northeast of Boston, on the Boston, Revere Beach and Lynn and the Boston and Maine railroads. It is improved by street pavements, waterworks, and sanitary sewerage. Many Boston business men make it their place of residence. The principal buildings include the Carnegie library, the high school, the townhall, and the public bathhouse. Revere was settled in 1626, when it was known as Rumney Marsh, and received its present name in 1871. Population, 1910, 18,219.

REVERE, Paul, patriot, born in Boston, Mass., Jan. 1, 1735; died May 10, 1818. He was by trade a goldsmith and practiced copperplate engraving. Many events of the times preceding the Revolution were illustrated by him in engravings and caricatures. He was one of the prime movers of the Boston Tea Party and on April 18, 1775, apprised the citizens of Lexington and Concord of the intended expedition of the

British. This eventful act was made the subject of Longfellow's poem, "The Midnight Ride of Paul Revere." He entered the army at the beginning of the war and attained to the rank of lieutenant colonel of artillery. Subsequent to the war he established the Revere Copper Company, the first company to refine and roll copper in America, which is still doing business. In 1795 he laid the corner stone of the Massachusetts capitol and founded the Charitable Mechanical Association.

REVIVAL (re-viv'al), the name used among Protestants to denote a time of active work in the church, usually a period of two to six weeks. In this sense it applies only to certain Evangelical churches, such as the Methodist, Baptist, United Brethren, and Presbyterian. These denominations and a number of others set apart a brief period for specially active work among the members and in the community to strengthen their faith and extend the Christian belief and practice. It is a time for local missionary work, when new members are to be brought in and when the spiritual welfare is to be emphasized with special fervor. Formerly these revivals were conducted by the local ministers with the aid of the elders and the other officials, but later aid came to be extended by other ministers of the same denomination, and finally Evangelists were appointed or chosen to carry on the work at certain periods of the year. For this purpose camp meetings were organized, since the buildings rarely furnished ample accommodations for the large numbers in attendance, or tents were erected to supplement the seating capacity of the church edifices.

Church revivals may be said to have reached their height in the time of the Crusades, when a general movement was inaugurated in Europe to establish a permanent foothold for Christianity in Asia. The Crusades cover the period from 1096, the beginning of the first Crusade, until 1291, when Acre was captured by the Sultan of Egypt. Another great period of revivals spread over Europe at the time of Reformation, which may be said to have been inaugurated by John Huss in Bohemia, by Luther and Zwingli in Germany, and by Bruce and Livingston in England and Ireland. John Wesley and George Whitefield, in the 18th century, conducted a revival in England that gave rise to the Methodist and other evangelical churches. New England witnessed a revival under the preaching of Jonathan Edwards. The camp meeting was the forerunner of the Chautauqua assembly, which may be said to have brought about in the educational and literary fields what has been done by the revivals in a spiritual way. Moody and Sankey, who united preaching with singing, and William A. Sunday induced an extensive revival movement in the United States. Work of a similar character is carried on by the Roman Catholics through organization work known as missions, which

are designed to renew spiritual activity and per-

petuate religious fervor.

REVOLUTION (rev-o-lu'shun), any fundamental change in government, or a revolt against an existing government and the establishment of a new one in its stead. Revolutions are mainly brought about by internal causes. However, the change must be accomplished completely to constitute a revolution, otherwise it is generally termed a rebellion, or an insurrection. Among the notable revolutions of modern times is that of England in the 17th century, which began in 1642 with a quarrel between Charles I. and his Parliament and ended in 1649, when the king was brought to the block. A republic was organized with Oliver Cromwell as protector, but the monarchy was restored in 1660 by the return of Charles II. The great Revolution in America began in 1776, when the colonies declared their independence of Great Britain. It ended with the surrender of Cornwallis at Yorktown in 1781. The great Revolution of France began at Paris in 1789 and ended with the beheading of Louis XVI. on Jan. 21, 1793, though some writers place the end in 1794, when Robespierre was guillotined. Two other revolutions occurred in France. The one of 1830 deposed Charles X. and placed Louis Philippe on the throne and the Revolution of 1848 established the second republic. Some writers regard the establishment of the third French republic, in 1871, as a revolution. The republics of South America were practically all established by revolution, including the Republic of Brazil. Russia underwent two vast revolutions, those of 1904 and 1917.

REVOLUTIONARY WAR IN AMERI-

CA. See United States, page 2979.

REVOLVER (ré-volv'er), a firearm which resembles the pistol, but differs from it in having a breech-loading cylinder so arranged that the cocking of the hammer revolves it and brings the next cartridge in line for firing. Many kinds of revolvers are in use. They have from three to six chambers in the cylinder and differ widely in size and mechanical construction. The cheaper kinds are cocked by means of pulling the hammer back with the finger, while the more expensive are self-cocking; that is, they may be cocked and discharged by simply pulling the trigger. Others are made with a concealed hammer, thus guarding against the danger of being discharged by accident. In some revolvers is a safety latch to prevent them from being fired without first releasing the internal hammer by pressure. In 1818 Elisha H. Collier patented the first weapon of this kind in the United States, and in 1835 Samuel Colt invented the famous revolver that bears his name. The principle employed in a revolver is used also in rifles and guns designed to throw small projectiles, as in machine guns of the Gatling kind.

REYNARD THE FOX (rā'nērd), an epic

fable of the Middle Ages, written at some time between the 10th and 12th centuries. However, the first printed edition did not appear until 1517, when it was published at Rostock, Germany. It was written in the low German dialect by one signing himself Hinreck van Alckmer, but the real name of the author is believed to be Hermann Barkhausen, a book printer in Rostock, who wrote under a pseudonym. The characters in the story are animals, which are represented as speakers and actors. They are treated with such a degree of interest that many translations have been made into different languages, and few fables are at present better

known or more popular.

The writer of Reynard the Fox represents that on one eastertide Nobel the Lion, king of beasts, held court, to which he summoned all the animals, both great and small, to do him homage. All gave willing obedience to the summons except Reynard the Fox, who was promptly summoned for this and other misdeeds to appear before the king of beasts, Bruin the Bear being sent to command his attendance. However, Reynard employed his well-known tactics to escape punishment by informing Bruin that a rich fund of honey could be found in a split tree, to which the bear at once hastened, but got fastened in his attempt to secure the honey and was almost beaten to death by angered peasants before he was able to escape. The Lion next sent Tibert the Cat as a messenger, but Reynard persuaded him to go on a chase by relating that a nest of mice could be found in a certain place, and in attempting to secure the prize he was caught in a noose and barely escaped with his life. Grimbart the Badger next went as a messenger, and, being less vain than those who had gone before, he succeeded in persuading Reynard to appear at court, where he was at once tried and it was decided that he should die. His death was to be by hanging.

When Reynard the Fox had ascended the gallows, he was asked if he had something further to say before suffering death. Instead of making a confession of his guilt, he turned to the Lion and informed him that Bruin the Bear and Isengrim the Wolf had planned to kill the Lion; but, since he and his old father Reynard were not friends of the wicked bear, he had stolen and hidden their treasure, for which reason he wanted to inform the Lion of his danger. The king of beasts at once pardoned Reynard and imprisoned both Bruin and Isengrim. Trouble again arose when the Lion wanted Reynard to show him the treasures, but he soon excused himself by saying that it was secure at some distance and that he did not have time to look it up immediately, as he had taken an oath to go to Rome on a pilgrimage.

The skillfully devised story was cause enough for the Lion to let Reynard go at once to redeem his vow. However, he took Belim the Ram and Cuwaert the Hare with him. Soon

after starting the three came to the home of Reynard, which he induced the Hare to enter by promising him rest and a good meal, but at once fell upon him and ate all but his head. This he put into a sealed satchel, which he sent back to the Lion by the Ram, telling the latter that it contained letters of great value. When the Ram reached the court of the Lion, the king of beasts was greatly angered, and not only declared the Fox an outlaw, but gave freedom to the Wolf and Bear. It happened soon after that the Wolf and Fox met in the forest, when the former undertook to punish Reynard for causing him to be imprisoned, but the latter won a victory by his cunning and was thereby restored to the protection of the Lion.

REYNOLDS (ren'ŭlz), John Fulton, soldier, born in Lancaster, Pa., Sept. 20, 1820; killed in battle July 1, 1863. He graduated at the West Point Military Academy in 1841, was given a commission as first lieutenant in 1846, and served in the Mexican War, securing especial distinction in the battles of Monterey and Buena Vista. Soon after the close of the Mexican War he served against the Indians in Utah, and in 1859 became commandant of cadets at West Point. In 1861 he was made brigadier general of volunteers, taking part in the campaigns of the Army of the Potomac, and was taken prisoner, but was exchanged soon after. He became major general in 1862 and in the same year succeeded General Hooker in command of the first army corps, but on the first day of the Battle of Gettysburg he was killed in action by a rifle ball. A number of monuments have been erected to his honor, one in Philadelphia and another on the spot where he fell and died.

REYNOLDS, Sir Joshua, portrait painter, born at Plympton, England, July 16, 1723; died Feb. 23, 1792. He was a son of Samuel Reynolds, rector of Plympton, who wished him to study medicine. However, his taste for painting predominated at an early age, and by the kindness of Captain Keppel he was enabled to study art in Italy for three years. In 1752 he returned to England and soon after established a studio in London, where he became noted as the most eminent portrait painter since Van Dyck. He was elected president of the newly organized Royal Academy in 1769. King George III. knighted him and at the death of Ramsey, in 1784, he became painter to the court. About 700 engravings have been made from the pictures of Reynolds. Among his productions are portraits of the most eminent personages of his time. His works are especially beautiful on account of trueness to life and exactness of detail. Reynolds was a personal friend of the most distinguished scholars and literary men of his day, among them Johnson, Goldsmith, Burke, and Garrick. He is the author of "Discourses on Painting," which he delivered in lectures before the Royal Academy. Besides the large number of portraits furnished by him, he painted other pictures, including "The Holy Family," "Macbeth," and "Death of Cardinal Beaufort."

RHADAMANTHUS (răd-á-măn'thus), in Greek mythology, a son of Jupiter by Europa and a brother of Minos, King of Crete. At Thebes he married Alcmene, the widow of Amphitryon, and subsequently he conquered and became the ruler of the Cyclades. On account of his inflexible integrity he was made one of the judges in the lower world, and as such was associated with Minos and Aeacus. According to Plato, he judged the souls of Asiatics, while Aeacus passed decrees upon those of Europeans, but when they could not agree Minos cast the deciding vote.

RHEA (re'a), the name of a large bird native to South America, found chiefly in the valleys of the Amazon and the La Plata. It is allied to the ostrich, but is distinguished from it by having no tail, three-toed feet, and a covering of feathers on the neck and head. Although the wings are unfit for flight, they are more highly developed than those of the ostrich and the emu of Australia. The body stands about three feet high, but the male is somewhat larger than the female. The color of the plumage is a brown tint. While the plumes of the wings are marketed for dust brooms, they are inferior to those of the ostrich and are little used for ornamentation. One male is usually associated with two or more females, who build a common nest and lay from twenty to thirty eggs, which are incubated by the male. These birds feed on grass, berries, worms and insects. In case of danger they run swiftly, when they use the wings as an aid to make good their escape. See Ostrich.

RHEA, or Cybele, the daughter of Uranus and Ge, that is, of Heaven and Earth, and the wife of her brother Cronus. She is reputed to have been the mother of Zeus, Hera, Hades, Hestia, Demeter, and Poseidon. According to some writers she was the symbol of the reproductive power of nature. Her ancient place of worship was in Crete, on Mount Ida, where she is said to have given birth to Zeus.

RHEIMS (rēmz), or Reims, a city of France, in the department of Marne, on the Vesle River, eighty miles northeast of Paris. It is located in a fertile region, has extensive railroad facilities, and is one of the important commercial and manufacturing cities of France. A large cathedral in the Gothic style of architecture was built at Rheims in the 13th century. It has many other churches, several institutions of higher learning, and a fine public school system. The manufactures include cotton and woolen goods, blankets, champagne, machinery, earthenware, toys and scientific instruments. It has been the seat of an archbishopric since the 8th century and was made the place of coronation in 1179, when Philip Augustus was crowned

here. Rheims is famous as the place where Clovis was baptized in 496, for the crowning of the dauphin in the presence of Joan of Arc, and for the fact that all the French kings were crowned here down to 1825, except Henry IV., Napoleon I., and Louis XVIII. The city was occupied by the Germans in 1870, and bombarded it in 1914 and 1915. The growth of Rheims is due largely to its extensive railway facilities.

Population, 1914, 118,240.

RHETORIC (ret'ó-rík), the art that treats of discourse, or the expression of thought by means of language, either oral or written. Aristotle wrote the first treatise on rhetoric, a work that is still considered valuable as a text of reference. He treated the subject as a branch of logic and applied its rules largely to oratory. Aristophanes of Byzantium was the first to introduce rhetorical points and accents and Quintilian carried on teaching in rhetoric in the Roman capital for more than twenty years, publishing his famous work on the subject, entitled "Education of an Orator." It may be said that Quackenbos (q. v.) is among the best known American writers on the subject.

Rhetoric is divided into two parts, style and invention. Style treats of the manner of expression and, as a word, was derived from the Latin stylus, a small steel instrument used by the Romans for writing on waxen tablets. Invention in rhetoric is the art of putting together what one has to say on a subject. It does not include finding out what to say, but rather consists in putting statements of facts, our observations upon men and things, our feelings, and our conclusions, into readable shape. The subject of invention is so extensive and complicated that no two authorities exactly agree upon every detail. As a whole, it may be said that rhetoric is the art by which the discourse is adapted to its end. This includes at least four important purposes in speaking or writing: namely, to enlighten the understanding, to please the imagination, to move the passions, and to influence the will.

RHEUMATISM (ru'mā-tīz'm), an inflammation or malady with aching pain, usually of a variable or acute nature. It affects equally the muscles, the joints, and other structures. Exposure to cold and damp are among the ordinary causes of rheumatism, but it likewise results from severe labor, insufficient nutrition and the reduction of vitality by an over-consumption of stimulative food without sufficient exercise to eliminate the waste from the system. No specific time in life can be assigned in which it may attack the body, but rheumatic affections are most frequent between the ages of 15 and 35 years. Acute cases are generally attended by affections of the heart, particularly of the pericardium. Young persons are frequently attacked by a form known as Saint Vitus' dance. Swollen joints attended by severe pain often accompany rheumatism. Complicated cases usually become chronic, often ending in severe deformity and twisting of the joints. A common form of muscular rheumatism is known as *lumbago*. Rheumatism is more or less hereditary.

RHINE (rin), or Rhein, an important river of Europe, one of the finest and most historical streams in the world. It rises in Switzerland, has a general course of about 765 miles toward the north and west, and flows into the North Sea. Two streams form the Rhine in the Swiss canton of Grisons, which are known as the Vorder Rhein and the Hinter Rhein. A short distance below the junction it passes through Lake Constance and at the town of Basel turns toward the north and enters Germany, in which country most of the river is located. The part from the vicinity of Saint Gothard's Tunnel to Basel is generally known as the Upper Rhein; the part from Basel to Cologne, as the Middle Rhein; and from Cologne to the North Sea, as the Lower Rhein. It enters Holland after turning toward the west, but soon divides into numerous branches, entering the sea by a delta.

The Rhine is an important commercial highway, being navigable a distance of nearly 600 miles. It is connected by numerous canals with other river systems, including those of the Danube and the Rhone. On its banks are many thriving cities, including Arnheim, Leyden and Utrecht, in Holland; Bonn, Coblenz, Cologne, Düsseldorf, Mentz, Mannheim, Strassburg, Spires, and Worms, in Germany; and Con-stance and Basel, in Switzerland. The principal tributaries are the Aar, Moselle, Main, Neckar, and Lippe rivers. The scenery of the Rhine is noted for its great beauty, both in Switzerland and Germany, but particularly in the latter country. In Holland it is less beautiful, owing to the generally level character of the region through which it passes. Much of the land of the Rhine delta has been redeemed by dykes. In some places the embankments are nearly thirty feet above sea level. More than a million tourists visit the Rhine every year.

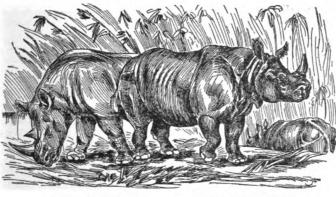
RHINELANDER (rīn'lăn-dēr), a city of Wisconsin, county seat of Oneida County, 102 miles northwest of Green Bay. It is on the Wisconsin River, at the Pelican Rapids, and has communication by the Chicago and Northwestern and the Minneapolis, Saint Paul and Sault Sainte Marie railroads. The surrounding country produces lumber, cereals, and live stock. Extensive water power is furnished by the Pelican Rapids. The chief buildings include the county courthouse, the high school, and several fine churches. Electric lighting, waterworks, and drainage are among the public utilities. It has manufactures of furniture, ironware, malt liquor, and machinery. Population, 1905, 5,435; in 1910, 5,637.

RHINE PROVINCE, or Rhenish Prussia, a part of the German Empire, a province of Prussia. It is bounded on the north by the

Netherlands, east by Westphalia and Hesse-Nassau, south by Lorraine, and west by Luxemburg, Belgium, and the Netherlands. The area is 10,423 square miles, nearly half of which is in a state of cultivation. A large part in the north is low and level, while the south is hilly and undulating. Drainage is principally by the Rhine and the Moselle. Agriculture is the principal occupation, but extensive interests are vested in manufacturing and commerce. Wheat, rye, barley, oats, hops, tobacco, and grapes are the leading products. The extensive vineyards are located along the Rhine and the Moselle, where wine is manufactured extensively for exportation. Coal is mined in large quantities and there is a considerable output of lead, iron, zinc, salt, and copper.

The manufacture of textiles has attained a high state of development, especially in Krefeld and Aix-la-Chapelle. Needles, locomotives, glass, chemicals, leather, paper, sugar, and machinery are produced in large quantities. A network of railways and electric lines furnish transportation to all parts of the province. It has an extensive trade in cereals, wine, textiles, and other manufactures. For the purpose of local government it is divided into the five districts of Coblenz, Cologne, Düsseldorf, Treves, and Aix-la-Chapelle. Coblenz is the capital of the province. Within the last two decades it has increased rapidly in population and is now the most densely inhabited province in Prussia. Population, 1910, 7,120,519. RHINOCEROS (ri-nos'è-ros), an ungulate

RHINOCEROS (ri-nos'e-ros), an ungulate mammal, allied to the elephant, tapir, and hippopotamus. Next to the elephant it is the most



BLACK RHINOCEROS.

INDIAN RHINOCEROS.

powerful animal now living. A number of species have been described, all of which are native to the warmer parts of Asia and Africa. They are usually harmless and of low intelligence, but display considerable ferocity when provoked, and can run with great speed. The largest are about six feet in height at the shoulders, with short legs and a very heavy and solid body. They feed on grass and other vegetable forms. Most species prefer to loiter in

marshes and on the banks of streams, where they wallow in the mud, while some frequent open country. Their flesh is eaten by natives and their skin, which is thick enough to be proof against the claws of lions and even bullets, except at the neck and head, is used for whips and shields. One young is brought forth at a time. Little more than mere traces of hair appear on the skin. The hoof terminates in three toes, and one or two horns are attached to the nasal or frontal bone.

The one-horned, or Indian, rhinoceros is the largest of the genus. It has a very thick, black horn, which sometimes is two feet long and eighteen inches in circumference at the base, and the skin is peculiar for having definite folds. The black rhinoceros is native to South Africa. This species has two horns, the smaller of which grows behind the other, and is dreaded more for its ferocity and strength than the lion. Several species are found in the islands of Java, Sumatra, and Borneo, including the well-known Javanese rhinoceros, all of which are one-horned. The rhinoceroses of Asia are more docile than the African and have been trained as beasts of draft and burden. Traces of many extinct species are found as early as the Miocene tertiary period.

RHODE ISLAND (rod i'land), one of the original thirteen states of the United States, belonging to the North Atlantic group, popularly called *Little Rhody*. It is bounded on the north and east by Massachusetts, south by the Atlantic, and west by Connecticut. The extreme length from north to south is 49 miles and the greatest breadth from east to west is about 40 miles.

It has an area of 1,250 square miles, of which 97 square miles are water surface. In area it is the smallest State in the Union.

Description. Rhode Island is located entirely in the Atlantic coast plain, but its surface is somewhat diversified, being hilly in the northern part. It slopes toward the south and along the Atlantic coast is a level tract. Durfee Hill, in the northwestern part, has an altitude of 805 feet and is the highest point. The general elevation is less than 600 feet. Narragansett Bay, a large and branching inlet, extends northward from the Atlantic

about 40 miles. Within it are inclosed several islands, including Aquidneck, or Rhode Island, which is three miles wide and fifteen miles long and contains the town of Newport.

The northern part is drained largely into Narragansett Bay by the Blackstone and the Pawtucket rivers. The Ten Mile River forms a part of the eastern border. A small section in the northwestern part is drained by head streams that cross into Connecticut. The Pawcatuck River drains a large section in the southwestern part, flowing into the Atlantic on the border of Connecticut. Many of the streams are rapid and supply considerable water power. Numerous small lakes are found in many places.

The climate is similar to that of southern Massachusetts and like it is influenced favorably by winds from the Gulf Stream. At Newport, on Aquidneck Island, the mean temperature is This locality is often referred to as the Eden of America, owing to its fine climate, delightful beaches, and bold cliffs. Farther north the extremes of temperature are greater, ranging from about zero in the colder part of winter to 95° in July. All parts of the State have an abundance of rainfall, which averages about 40 inches in the north and 48 inches in the south. All seasons and localities are healthful.

MINING. The minerals are numerous, but the output is not extensive. Deposits of anthracite

the

coal occur in several

sections, but some of

workable, owing to the fact that they are

located near the bay.

Extensive beds of

granite and limestone

abound, the former being quarried largely

for monuments and

paving blocks, while

the larger part of the output of the latter is

used in making lime.

beds are not



RHODE ISLAND.

1, Providence: 2, Pawtucket:
3, Woonsocket: 4, Newport: 5,
Westerly. Chief railroads indicated by dotted lines.

tions Other minerals tions. Other minerals include clays, serpentine, graphite, and talc.

AGRICULTURE. About 67 per cent. of the land surface is included in farms, which average 83 acres. However, only about half of the land is improved. In some sections the soil is of a sandy character, but most of the surface is quite fertile. Hay and forage are the principal crops, but corn, oats, rye, and barley are grown successfully. Considerable gardening is carried on to supply the local market with potatoes, beans, celery, strawberries, and sweet corn. Dairy farming is an important enterprise, yielding large returns from the sale of milk and butter. The cattle grown are of a fine grade and fully two-thirds are milch cows. Other live stock includes horses, sheep, swine and poultry.

MANUFACTURES. A larger number of people are engaged in manufacturing than any other industry and the returns show a steady growth in this enterprise since 1850. Pawtucket and Providence are centers of the cotton-spinning industry, where about two million spindles are employed. The textile products have an annual value of about \$110,500,000 and represent the most important manufactures. They include worsted goods, silk textiles, hosiery, and cotton

and woolen goods. In the output of dyed and finished textiles the State has the third rank in the Union. It holds first rank in the manufacture of jewelry. Other manufactures include firearms, machinery, locomotives, pipe tobacco and cigars, and rubber and leather goods. The fisheries furnish a large output for canning and curing. Large quantities of fruit and vegetables are preserved and canned.

TRANSPORTATION AND COMMERCE. The railroads have a total length of 225 miles and are largely under the control of the New York, New Haven and Hartford Railway Company. Electric lines are operated in the cities and many rural districts, furnishing communications between numerous points within the State. The highways are in a good state of construction and repair. Providence is the most important commercial center and has considerable foreign trade. The principal exports include jewelry and textiles, while the imports embrace lumber, raw cotton and silk, and foodstuffs.

GOVERNMENT. The present constitution was adopted in 1842. It vests the executive authority in the governor, lieutenant governor, secretary, treasurer, and attorney-general, all elected annually on the Tuesday after the first Monday in November. Legislative authority is exercised by the General Assembly, which consists of a senate and a house of representatives. One senator and one or more representatives are elected in each town or city, but no legislative subdivision can have more than one-sixth of the 72 members who constitute the lower branch. The senate has 38 members besides the Governor, who is ex-officio president of that body. A supreme court has ultimate judicial authority, and subject to it are such inferior courts as the Legislature may establish. Local government is administered in the towns and counties.

EDUCATION. The State has a well-organized system of common schools, which are graded from the kindergarten to the public high school. At present illiteracy is placed at 8.4 per cent., but among the native population it is much less. Brown University, one of the oldest institutions of higher learning in the United States, is located at Providence, which is also the seat of the State normal school and the Rhode Island School of Design. Many private and secondary schools are maintained. Kingston is the seat of the Rhode Island College of Agriculture and Mechanic Arts and Bristol has a soldiers' home. Ample provisions have been made for training in the industries and for the care of the unfortunate and incorrigible. Cranston has the State farm, which contains an insane asylum, the reformatory, the workhouse, and the penitentiary.

INHABITANTS. The State has a density of 407 inhabitants to the square mile, which is the largest population per square mile in any of the states. The foreign-born population is 134,519, including principally Irish, English, and Canadians. Providence, on the Providence River, is the capital and largest city. Other cities and towns include Pawtucket, Woonsocket, Newport, Central Falls, Warwick, Lincoln, Cranston, Cumberland, and Westerly. In 1900 the State had a population of 428,556. This included a colored population of 9,506, of which 366 were Chinese and 9,092 Negroes. Population, 1907, 500,692; in 1910, 542,610.

HISTORY. It is thought that the Norsemen were the first Europeans to visit Rhode Island. They cruised on its shores in the 10th century. Roger Williams was banished from the Massachusetts Bay colony for attacking its theocratic government and in 1636 made the first settlement at Providence, where he advocated complete separation of church and state. The followers of Anne Hutchinson founded Portsmouth in 1638 and Newport was settled in 1639. These settlements were organized as one colony under a charter in 1644, but a new charter was granted in 1663, which remained the fundamental law until 1842. The peculiarity of apportionment of representation and a property qualification for voting caused Dorr's Rebellion in 1842, when a new constitution was adopted, which extended the right of suffrage to all male citizens. The State did not ratify the national Constitution until 1790, this delay being occasioned by a desire of the agricultural classes to reserve the power to levy import taxes and to retain paper money as legal tender. Its citizens were active supporters of the Revolution and all other national contests in favor of maintaining the nation. The property qualification for voting was abolished in 1888 and since 1893 elections to office are by a plurality vote. Formerly Newport and Providence were the joint capitals, but the latter has been the sole capital since 1900.

RHODES (rodz), an island situated southwest or Asia Minor, in the Mediterranean Sea, belonging to Turkey. The length is about 40 miles; greatest width, 20 miles; and area, 425 square miles. Anciently it was an independent state of Greece, when it was known as Rhodos, and its capital, Rhodes, dates from 404 B. C. It is famous as a maritime city and its neglected harbors were once the seat of vast commercial activity. The city was surrounded by strong walls and at the entrance of one of its ports stood a great statue of Helios, called the Colossus of Rhodes. This work of art was so re-markable that it became known as one of the seven wonders of the ancient world. Its height was 70 cubits and it was only one of about 3,000 statues in that city, which was then a noted center of intellectual and political power. Alexander the Great captured Rhodes and established a powerful garrison there, but at his death, in 323 B. C., the Macedonians were expelled from the island. The Rhodians sided with Caesar against Pompey, and in 42 B. C.

Cassius entered the city and carried off many of its treasures. However, it continued to be a center of learning for many centuries under the emperors of Byzantium. The Knights of Saint John of Jerusalem settled on the island in 1310 and until 1565 defended themselves against the Turks, but in the latter year they were compelled to yield. Since then it has been a Turkish possession. The island has a population of about 32,016, of whom fully 25,000 are Greeks.

RHODES, Cecil John, capitalist and statesman, born at Bishops Stortford, England, July 5, 1853; died March 26, 1902. He descended from a noble family and his father was for many years vicar of Saint Michael's Church, in the Bishops Stortford parish. After attending a grammar school he entered Oxford University, and for a time studied law at the London Inner Temple. Soon after he went to South Africa on account of ill health, where he became interested in diamond mining and served in the Cape Colony assembly. He was made Premier of the colony in 1890 and the following year visited England, where he made a donation of \$50,000 to further the Irish Home Rule movement advocated by Parnell. Shortly after he returned to South Africa to take the field against the native King of Matabeleland and in 1896 instigated the notorious Jameson raid into the Transvaal, on account of which he resigned as Prime Minister of Cape Colony. However, he was reëlected to the colonial Parliament in 1897, and two years later visited England to plan for a railroad line to ultimately connect Cape Town with Cairo. He is noted as one of the leading British financiers and one of the most influential citizens in promoting the expansion of English influence in South Africa. In the latter part of 1899 he was among those besieged in Kimberley by the Boers, but early in 1900 the city was relieved. See Rhodes

RHODESIA (ro-de'zĭ-a), a possession of Great Britain in South Africa, divided by the Zambezi River into Northern and Southern Rhodesia. It is bounded on the north by the Congo Free State and British Central Africa, east by British Central Africa and Portuguese East Africa, south by the Transvaal Colony, and west by German Southwest Africa and Angola. The southern part includes Mashonaland and Matabeleland, two regions lying between the Zambezi and the Limpopo rivers.

Northern Rhodesia has an area of about 288,-500 square miles and a population of 846,000. It has fine forests of valuable timber, which yield India rubber and large quantities of lumber. Coal, gold, and copper are mined. Cattle and horses are grown in large numbers by the natives, whose chiefs retain their authority. For the purpose of government it is divided into Northeastern Rhodesia and Northwestern Rhodesia. Administrative headquarters for the former are maintained at Jameson and for the latter at Livingstone.

Southern Rhodesia has an area of 143,830 square miles and a population of 619,000. It embraces the two provinces of Matabeleland and Mashonaland, the former having a population of 208,700 and the latter 410,000. The soil is generally fertile and the climate is favorable to Europeans. Cereals, tobacco, rubber, cotton, vegetables, and fruits are produced in large quantities. The minerals include gold, silver, copper, iron, lead, coal, and diamonds. About 2,750 miles of railways are in operation, the main line of which forms a part of the Capeto-Cairo Railway. This line is carried over the Zambezi River at Victoria Falls by one of the highest bridges in the world. Bulawayo is the chief town of Matabeleland and Salisbury of Mashonaland. The inhabitants consist almost exclusively of natives, including about 5,150 whites.

The entire possession of Rhodesia was governed by the British South Africa Company until 1907, when steps were taken to reorganize the government on the principal of federation. Salisbury is the seat of government and the resident of a commissioner and commandantgeneral. Each division is administered by an administrator, who is assisted by an executive council. Formerly the region was held by the Matabeles, a native race, who concluded an alliance with Great Britain. A royal charter was granted to the British South Africa Company in 1889. Lobengula, the chief of the Matabeles, headed an uprising in 1893, after which the entire region was annexed as a British possession.

RHODES SCHOLARSHIPS, the stipends established by the will of Cecil John Rhodes (q. v.) for the purpose of maintaining a certain number of students at Oxford University, England. It is stated in the will that "a good understanding between England, Germany, and the United States will secure the peace of the world, and that educational relations form the strongest tie." The scholarships were distributed as follows: Australia, 18; Bermuda, 3; Canada, 6; Cape Colony, 12; Germany, 15; Jamaica, 3; Natal, 3; Newfoundland, 3; New Zealand, 3; Rhodesia, 9; and two to each State and Territory of the United States. The beneficiaries are chosen under methods adopted in the several countries, those of Germany being by appointment of the emperor and those of the United States being named by committees in each State and Territory. The age of eligibility is fixed between 19 and 25, and candidates must be unmarried and citizens of the states or countries by which they are appointed. In most cases the committees are presided over by presidents of universities and candidates are chosen on the basis of scholarship. The scholarships have a value of \$1,500 per year and are tenable for three years.

RHODODENDRON (rō-dō-dĕn'drŏn), an extensive genus of shrubs of the heath family. The leaves are usually alternate and are evergreen in some species, and the flowers are in clusters and often variously colored. Many spe-

cies are cultivated for ornament in Canada and the United States, where they are found in abundance in the native state along the Pacific coast and in the Allegheny Mountains. Sev-



RHODODENDRON.

eral species are native of Japan, China, Australia and South America. Various American species have been naturalized in Europe, where they are cultivated extensively in gardens and parks as flowering plants. Some species abound in the Alps, where they are known among the Germans as Alpine roses. The great rhododendron is found in abundance in some of the Southern States. It is from ten to twenty feet high.

RHONE (ron), a river of France, which rises in Switzerland, twenty miles southwest of the source of the Vorder Rhein. The beginning is in the Rhone glacier, about 7,548 feet above sea level. From Lake Geneva, through which it passes, it has a general southwesterly course to Lyons, where it makes a bold turn toward the south and enters the Gulf of Lyons by an extensive delta. The length is 500 miles, the basin has an area of 37,500 square miles, and 350 miles of its course are navigable. The Saône, Ain, Isère and Durance are its principal tributaries. It is connected by canal with the Rhine, Loire, Seine, and Meuse rivers.

RHUBARB (ru'barb), or Pie Plant, a genus of plants cultivated for medicinal use and as a food. About twenty species have been described. The stems are erect and thick, often from five to seven feet high, and bear a cluster of seeds at the upper end. The roots are fleshy and the leafstalks, when young and tender, are used for pies, tarts, preserves, and a kind of wine. In many countries the rhubarb is cultivated chiefly for its roots, owing to their medicinal properties. Rhubarb as a medicine is slightly astringent, when given in small doses, and in large doses acts as a purgative. It is used mostly in treating jaundice, catarrh of the biliary duct, and for certain skin diseases. The plant is cultivated for medicine in China and Russia. In Canada, the United States, and nearly all countries having a temperate climate it is grown for food. The root winters in the

RICARDO

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ground in moderately cold climates, hence the young shoots appear early in the spring.

RHYME (rīm), a composition in verse, in which the terminating word or syllable of two or more lines correspond in sound. Poems differ in the degree of resemblance of the endings, but in strict rhyme it is required that the last stress vowels in the rhyming lines agree exactly, although the lines must differ in some respects. The words rain, train and strain rhyme with each other, but rain and reign, though widely different in spelling, are sufficiently similar in sound to form good rhyme. From this it will be seen that rhyme is governed by the sound instead of by spelling or meaning. In some poems each couplet, or two lines, rhyme, as in Whittier's "Maud Muller":

> Maud Muller, on a summer's day. Raked the meadow, sweet with hay.

This may be considered a simple style of forming rhymes, and productions written in this form are usually simple and clear in expression. Poems are formed by the writers according to their taste in stanzaic structure, some lines rhyming only at the end and others forming complete rhymes at various intermediate places. Some writers either introduce a limited amount of alliteration or use it extensively. Rhymes at the end of the lines are ordinarily between two or more verses, and sometimes the style is alternated, as in Shelley's "Cloud":

I bring fresh showers for the thirsting flowers, From the seas and the streams; I bear light shade from the leaves when laid In their noonday dreams.

The writers of ancient Greece and Rome did not make extensive use of rhymes, but this style of writing has been popular among the Arabs, Chinese, and other people of Asia from remote antiquity. Systematic rhyme came into use among the Romans in the time of Augustus, in the latter part of the 4th century, and was taken up in Western Europe with much eagerness during the Reformation, when the writing of religious songs formed an important branch of literature. Some of these writers, as Milton, made extensive use of alliteration.

RIBBON (rib'bun), the name originally applied to an article of ornament, but now employed to designate various products used in binding and tying articles of dress and for symbolical purposes. It is properly a narrow band of woven silk from less than an inch to not more than nine inches in width, but other materials are used extensively for the cheaper grades. The principal ribbons include satin, a smooth surface; grosgrain, a ribbed surface; and plush, a velvety surface. However, there are many varieties of each, differing in composition, weaving, and coloring. Crefeld is the center of ribbon manufacturing of Germany; Vienna, of Austria; Basel, of Switzerland; Saint-Etienne, of France; and Coventry, of

England. The ribbon trade of America and Europe aggregates annually about \$95,000,000.

RIBBON FISH, the name of several fishes found in the deep waters of all the oceans. The body is long and compressed like a tape, while the head is short and the mouth is narrow. On the back is a long and high dorsal fin. The anal fin is absent, while the caudal fin is either absent or but slightly developed. Three families of these fishes have been described, but each is represented by only a few species. The skin is naked and silvery and the entire structure is delicate in nearly all these fishes. Some specimens are from twelve to twenty feet long, but the thickness rarely exceeds two inches. They are not very numerous in any locality, but are found widely distributed from the polar to the tropical seas. A fish common to the Gulf of Mexico and the West Indies is known by the same name, owing to its dark brown bands that

characterize the body.

RIBOT (re-bo'), Théodule Armand, psychologist, born in Guingamp, France, Dec. 18, 1839. He studied at the Lycée de Saint Brieure and at the École Normale, Paris, and received a doctor's degree from the latter in 1875. For a number of years he was professor in the former institution, and in 1885 he was given the chair of experimental psychology at the Sorbonne. Later he was professor of experimental and comparative psychology in the College of France and much of his time was given to the investigation of psychology at the histological and physiological laboratories. He was a leader in developing interest in the study of psychology in France and was the founder of the Revue philosophique. Among his publications are "Philosophie de Schopenhauer," "Psychologie des sentiments," "Les maladies de la mémoire,' "Les maladies de la volanté," and "Psychologie allemande contemporaine.'

RIBS, the elastic arches of bone which constitute the larger part of the walls of the chest. Man has 24 ribs, twelve on each side of the chest. At the back they are attached to the spine. Seven pairs are tied by cartilages to the breast bone or sternum, in front, three are fastened to each other and to the cartilage above, and two are loose, or floating ribs. The first seven pairs are known as true, or vertebrosternal ribs, and the others are designated as false ribs. The name intercostal spaces is ap--plied to the spaces between the ribs. In respiration the ribs have more or less complex movement. A contraction of the seven upper intercostals causes the sternal end to be elevated and carried forward, causing the diameter of the chest to be increased. The natural form of the chest is that of a cone diminishing upward, which, when the clothing is not too tight, gives the greatest freedom of motion in respiration.

RICARDO (rǐ-kār'dô), David, economist and statesman, born in London, England, April

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19, 1772; died Sept. 11, 1823. He descended from Jewish parents and engaged with his father as a stockbroker. The two became alienated because the son married a Christian and held to the Christian faith, but young Ricardo established himself as a stockbroker, realizing a large fortune by careful devotion to business investments. In 1818 he became a member of Parliament and retained his seat until his death. He was a student of geology, chemistry, and political economy, and published a number of excellent works and made a series of contributions to the Morning Chronicle. His most noteworthy publication is "The High Price of Bullion a Proof of the Depreciation of Bank Notes," which appeared in 1809. In this he urged the need of a metallic basis for the national currency. Soon after he completed a work under the title of "The Plan for a National Bank." Other publications are "Principles of Political Economy and Taxation," "Protection to Agriculture," and "Influence of Low Prices of Corn on the Profits of Stock."

RICE, an annual cereal plant native to India, but now extensively naturalized and cultivated for its seed. Many writers assert that rice was



cultivated in China about 2822 B. C.; in the Euphrates Valley, about 400 B. c.; and near Pisa, Italy, as early as 468 A. D. It constitutes one of the most important foods and is used more extensively than any other foodstuff by the people of the world, being the principal food of nearly onethird of the human race. Sev-

eral thousand species have been enumerated, all depending somewhat on soil and climate. Some are grown on upland, but most of the rice sold in the market is tilled on marshy or inundated land, as in the swamps of the Carolinas, Louisiana, and Texas, and in the Nile and Niger valleys. The seed is sown like oats or wheat, after which the ground is flooded until it germinates, when the water is drawn off, but it is flooded a second time to kill the weeds, and a third time when about to head. In most regions the height of the plant depends principally upon the depth of the water, as the ear always grows above the surface, and the grain is produced in heads similar to oats. The water is drawn off shortly before the grain ripens and the crop is cut with reapers and threshed by machines much like oats and wheat.

Each grain of rice is covered with a husk, when the seed comes from the threshing machine, in which condition it is known as rough rice, or paddy. The husk, or hull, is removed by a huller, the essential part of which consists of heavy millstones that revolve rapidly, but are not close enough together to break the kernels. Several grades of rice result in the process of removing the husk on account of some grains being broken, but all of these are separated and sold as different classes of rice. The plan of cultivation and treatment varies somewhat in different countries, but in all cases moisture and a warm climate are quite essential to the production of the better grades. Asia produces more rice than all the other continents. The average yield is from 30 to 38 bushels per acre. Rice of the finest quality is produced in Georgia and the Carolinas. Land which is well suited for rice culture is worth about \$200 per acre. The fields are not as large as those in which corn and wheat are grown. Rice is chiefly a farinaceous food and contains only about seven per cent. of gluten. It is best for the system when eaten with milk or fatty substances.

RICE, Alice Hegan, author, born in Shelbyville, Ky., Jan. 11, 1870. She was educated at Hampton College, Louisville, and began to write

short stories at an early age. In 1902 she married Cale Young Rice (born 1872), an author and dramatist. Her writings are original in humor and the characters are largely real. In 1901 she published "Mrs. Wiggs of the Cabbage Patch," which was read very extensively. Other writings include "Sandy," "Lovey Mary," and "Mr. Opp."

RICE PAPER, a product manufactured from the pith of a plant native to Formosa. It is made ex-



ALICE HEGAN RICE.

tensively in China, whence it is exported in large quantities. Fine artificial flowers are made from this product and it is used to a considerable extent in water color drawings by artists. Several varieties of this paper are used in printing fancy and presentation books.

RICHARD I. (rich'ērd), King of England, surnamed the Lion-Hearted, born at Oxford, England, Sept. 8, 1157; slain March 26, 1199. He was the third son of Henry II. and his queen, Eleanor, and on July 6, 1189, succeeded his father on the throne. During his early life he was the cause of a long quarrel in the family of his father, and in 1184 sided with the King of France in a war against England. Shortly after ascending the English throne, he organ-

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ized a large army and took part in the third Crusade for the conquest of the Holy Land. His army joined the forces of Philip of France at Vezelai, whence the allied army of 100,000 men marched to Lyons, where they separated, but afterward met at Messina. Richard next sailed to Sicily, then to Cyprus, and on June 4, 1191, joined the Crusaders at Acre. This fortress had been besieged nearly two years, but soon after the arrival of Richard it surrendered, and he immediately began his march upon Jerusalem, but never ventured to make an attack upon the city. He accomplished nothing aside from the capture of Acre, and, after concluding a truce of three years with Saladin, commander of the Saracens, sailed for home, but was wrecked in the Adriatic Sea. Fearing discovery in Austria by his enemy, Duke Leopold, he undertook to pass through that country in disguise, but was discovered and surrendered to Henry VI., Emperor of Germany. He was at length liberated after imprisonment at Trifels and Worms, and in 1194 returned to England. Soon after he engaged in a war against Philip of France, in which he was killed.

RICHARD II., King of England, son of Edward the Black Prince, born at Bordeaux, France, April 13, 1366; died at Langley, Scotland, Feb. 14, 1400. He succeeded his grandfather, Edward III., on the throne of England in 1377. As he was a minor, the government was vested in a council of twelve, but his uncle, John of Gaunt, was excluded from the council. Excessive taxations and various abuses led to a peasants' revolt in 1381, which was headed by Wat Tyler, and in the factional contentions that followed the young king showed considerable boldness and presence of mind.

In 1382 he married Anne of Bohemia, daughter of Emperor Charles IV., and in 1385 ended the war with France only to take up arms against Scotland. He declared his majority in 1389, thus freeing himself from the dictation of the council, but the weak king soon let the reins of government pass to the Duke of York, though the country enjoyed several years of peace and a fair degree of prosperity. However, the queen died in 1394 and he soon after married Isabella of France. In 1397 he became entangled in a quarrel with Warwick, Gloucester, and Arundel, and when Parliament met all were declared guilty of treason. This resulted in the execution of Arundel, while Warwick was banished, and Gloucester died from violence in prison.

On the death of John of Gaunt, in 1399, Richard seized the Lancaster estates, and this unjust act became the occasion of his downfall. While the king was in Ireland, the Duke of Hereford organized a force to regain the Lancaster estates, and succeeded in raising sufficient military power to force the king into submission on his return to England. Parliament, in 1399, deposed him, and on Sept. 29 he executed a deed resigning the crown to Henry. Though at first

liberated, a month later Richard was sentenced to life imprisonment at Pontefract Castle. A conspiracy was discovered in 1400, against Henry IV., in which Richard was implicated, and his death soon after in prison is thought to have resulted from violence.

RICHARD III., King of England, last of the Plantagenet dynasty, born at Fotheringay, England, Oct. 2, 1452; died in battle at Bosworth, Aug. 21, 1485. He was the youngest son of Richard, Duke of York, and a brother of Edward IV. The latter succeeded his father as king of England, in 1460, and soon after created Richard Duke of Gloucester and made him lord high admiral, in which capacity he served the king with much fidelity. He married Anne, daughter of the Earl of Warwick, in 1473, and in 1482 commanded an army into Scotland against James III. Edward IV. died in 1483 and left Richard as guardian to his son Edward V., then a youth of only thirteen years. However, Richard at once began to make plans with the view of acquiring the throne of England, and accordingly placed Edward V. and his younger brother in the Tower, while he had himself proclaimed King of England. The people soon organized a formidable insurrection against him, but he suppressed the uprising and executed the leaders. About the same time the two royal children were cruelly murdered in the Tower, it is thought with the knowledge of Richard. His reign was characterized by much cruelty and crime, which soon disgusted the people, and in 1485 Henry of Richmond landed in England as his rival for the throne. The two met in battle at Bosworth, where Richard was slain. This battle decided the War of the Roses and placed the house of Lancaster

RICHARDSON (rich'erd-sun), Henry Hobson, architect, born in Priestley's Point, La., Sept. 29, 1838; died April 28, 1886. After graduating at Harvard University in 1859, he studied architecture in Paris until 1865, when he returned to the United States and became a member of the firm of Gambrill and Richardson in New York City. Richardson may be said to have originated a particular style of architecture, possessing elements of strength and refinement. It was his disposition to produce effect by mass rather than elaboration of decoration. Among the noteworthy structures planned by him are the Brattle Street Church, Boston; the Trinity Church in the same city, built on the style of the Provençal cathedrals; and a number of halls at Harvard University. He was employed for several years as one of the architects on the State capitol building at Albany, N. Y. Richardson was a man of much intelligence and fascinating manners.

RICHARDSON, Samuel, eminent novelist,

born in Derbyshire, England, in 1689; died in London, July 4, 1761. He was the son of a carpenter and at fifteen years went to London as an apprentice printer, where he later established an office on his own account. He was known from his youth as a fluent letter writer, but he did not engage in literary work until about fifty years old, when he became the discoverer of a new literary form by accident. This occurred when a London firm wished to publish a series of model letters as a guide for letter writers, and he was selected as a suitable person to prepare such a work. However, he conceived the idea of making the letters tell a connected story and selected a country girl to represent the heroine, naming his production "Pamela, or Virtue Rewarded." This work was received with such favor that a large number of editions were issued.

Richardson's second novel, entitled "History of Clarissa Harlowe," appeared in 1749. This work is generally regarded his masterpiece. It is the tragic story of a young lady who falls a victim to a man of splendid talent and attraction, but of infamous character. A few years later he published "History of Sir Charles Grandison," in which he sought to portray the type of a true man, but it is quite evident that he was more successful in the delineation of women than of men. In these three works Richardson treated in an interesting manner as many different orders in the social scale. "Pamela" dealt with the low; "Clarissa Harlowe," with the middle class of society; while in "Sir Charles Grandison" he intended to represent an ideal hero, who would combine the graces and accomplishments of the man of fashion with the perfection of educational and religious culture. In 1754 he became the printer of the journals of the House of Commons. Among his writings not named above is an edition of "Aesop's Fables."

RICHARDSON, William Adams, jurist and statesman, born in Tyngsborough, Mass., Nov. 2, 1821; died in Washington, D. C., Oct. 19, 1896. In 1846 he graduated from Harvard University, where he studied law and was admitted to the bar in Boston. He soon rose as a prominent member of the bar, became judge of probate for Middlesex County in 1856, and in 1869 was appointed Assistant Secretary of the Treasury by President Grant. In 1873 he became Secretary of the Treasury, transferring shortly after the Geneva award of \$15,500,000 from London to Washington, but resigned in 1874 to become judge of the court of claims. President Arthur appointed him chief justice of the court of claims in 1885. He served as trustee of Harvard and lecturer on law in the Georgetown University, D. C. His publications include "The Banking Laws of Massachusetts," "History of the Court of Claims," and "National Banking Laws.'

RICHELIEU (rēsh'e-1550), Armand Jean du Plessis, Cardinal, Duke of, eminent statesman, born in Paris, France, Sept. 5, 1585; died Dec. 4, 1642. He descended from a

noble family and studied for a military career at the College of Navarre, but his elder brother, being bishop of Luçon, influenced him to study for the church. Accordingly he attained a de-

gree at the Sorbonne and in 1607 succeeded his brother as bishop of Luçon, being consecrated to that position by Cardinal de Givry in the presence of Pope Paul V. Louis XIII. of France appointed him secretary of war and foreign affairs in 1616, but the following year Louis quarreled with the queen mother and



CARDINAL RICHELIEU.

Richelieu was banished to Blois and later to Avignon. A reconciliation was effected soon after and the queen was restored to her position at court, Richelieu gaining marked influence. He was made cardinal in 1622 and became minister of state in 1624, a position which he retained until his death. It was Richelieu's design to strengthen the French court and with that end in view he devised a plan whereby the nobles and feudal lords were limited in power, many of the leading opponents being sentenced to life imprisonment or brought to the scaffold. This fairly begun, he began to plan with the view of weakening the house of Hapsburg, both in Germany and Italy.

He was instrumental in bringing Gustavus Adolphus into Germany as a champion of the Protestants in the Thirty Years' War, but only because he designed to humble the pride of Austria. Immediately after he undertook to suppress the Huguenots, which he accomplished in part in 1628 by capturing La Rochelle. When their influence became limited, he turned against the queen mother, Mary of Medici, for the reason that she had conspired to cause his fall, whereupon she was compelled to withdraw into exile at Cologne. Richelieu was signally successful in carrying out his vigorous policy, both at home and abroad. He made his administration quite impressive by establishing many internal improvements and promoting gigantic military maneuvers. As a statesman he attained to much eminence, giving the royal house freedom from the influence of the nobility. He patronized learning and is the founder of the French Academy and the Royal Printing Presses. In 1631 he was raised to the rank of duke. He is the author of several works on economics, civics, and diplomacy.

RICHMOND (rich'mund), a city of Indiana, county seat of Wayne County, on the Whitewater River, 68 miles east of Indianapolis. It is on the Grand Rapids and Indiana, the Pittsburg, Cincinnati, Chicago and Saint Louis, the Chicago, Cincinnati and Louisville, and other

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railroads. The surrounding country is a rich farming and dairying district. The principal buildings include the county courthouse, the Morrison-Reeves Public Library, the Richmond Law Library, the Earlham College (Orthodox Friends), the Saint Stephen's Hospital, and the Eastern Indiana Hospital for the Insane. It has a fine city hall, a large high school, and Glen Miller Park. Among the manufactures are flour, engines, boilers, farming implements, earthenware and furniture. The city has electric street railways, brick and macadam pavements, and systems of waterworks and sanitary sewerage. It was settled in 1816 and incorporated in 1840. Population, 1910, 22,324.

RICHMOND, the largest city of Virginia, capitol of the State and county seat of Henrico County, 115 miles southwest of Washington, D. C. It is situated on the James River, about 125 miles from the Atlantic Ocean, and is reached from coast ports by steamship lines. The river has extensive rapids, which pass over a fall of 100 feet in six miles, hence furnish vast water power. Railway communication is provided by the Southern, the Chespeake and Ohio, the Seaboard Air Line, the Atlantic Coast Line, the Norfolk and Western, and other railways. Intercommunication is facilitated by an extensive electric system, which has branches to Seven Pines and other interurban points. The James River is spanned by several bridges, con-

necting with Manchester and other suburbs. DESCRIPTION. Richmond is located on a beautiful site of gently rolling ground, including an area of about sixteen square miles. site rises in terraces from the James and varies in altitude from 150 to 250 feet above sea level. The older part of the city is near the river, and the newer portion is toward the higher sections in the north and northwest, where a large residential district is located. homes generally are well built and beautified by lawns and avenues of trees and shrubbery. All of the streets are platted on a regular plan, crossing each other at right angles, and many are improved by pavements of stone, asphalt, and macadam.

Capitol Square, a tract of twelve acres, occupies the central part of Shockoe Hill and is a place of historic interest. It is situated in the heart of the city and contains the State capitol, completed in 1796. It is modeled after the Maison Carrée, Nimes, France. plans were sent from that country by Thomas Jefferson and are still preserved in the State library of Virginia. In the capitol are portraits and busts of eminent men, and in the rotunda is the celebrated marble statue of Washington by Houdon, the French sculptor. Upon the grounds are the Governor's mansion, the State library building, the life-size marble statue of Henry Clay, and the bronze statues of Governor Smith, Stonewall Jackson, and Hunter McGuire. An equestrain statue of Washington, by Crawford, near the west gate of Capitol Square, is considered one of the finest bronze works of art in America. Surrounding the base are bronze figures of George Mason, John Marshall, Andrew Lewis, Patrick Henry, Thomas Jefferson, and Thomas Nelson.

Thomas Jefferson, and Thomas Nelson.
BUILDINGS AND MEMORIALS. The city hall, a handsome structure of granite, faces Capitol Square on the north and near it is the Saint Paul's Church. The post office, the chamber of commerce, the soldier's home, the State penitentiary, the Masonic Temple, the Valentine Museum, and the Union railway station are other structures of note. Foremost among the historic buildings is Saint John's Church, in which Patrick Henry delivered his famous address, closing with the words "Give me liberty, or give me death." The residence of Jefferson Davis, now used as a Confederate museum; the residence of General Lee, now occupied by the State Historical Society; and the home of Chief Justice Marshall are of historical interest. The Confederate soldiers' and sailors' monument is on Libby Hill, or Marshall Park, and near it is the site of the famous Libby Prison. On Monument Avenue are a statue of J. E. B. Stuart, the defender of Richmond; an equestrian monument of Lee; and the famous monument of Davis, containing a balcony in which the Confederate States are represented. Monroe Park has a statue of General Wickham. Gamble's Hill Park affords a splendid view of the river and the historic Belle Isle. Hollywood Cemetery, the finest in the city, contains the graves of Jefferson Davis, John Tyler, James Monroe. J. E. B. Stuart, John Randolph of Roanoke, and 18,000 Confederate soldiers, whose memory is honored by a pyramidal monument of granite.

EDUCATIONAL AND OTHER INSTITUTIONS. Richmond is noted as a center of art and education. It is the seat of Richmond College, the Medical College of Virginia, the Union Theological Seminary, the University College of Medicine, the Hartshorn Memorial College for Girls, the Richmond Female Seminary, and the Virginia Mechanics' Institute. It has normal schools for white and colored students. Besides the State library with 100,000 volumes, it contains the Rosemary Public Library and the State Law Library. The Lee Camp Soldiers' Home, the Old Dominion Hospital, and the Saint Joseph's Orphan Asylum are among the benevolent and charitable institutions.

INDUSTRIES. In commerce and manufacturing industries Richmond occupies a place of eminence. It is the seat of one of the largest locomotive works in the Union, and has superior advantages for an extensive wholesale and jobbing trade. The manufacture of pipe tobacco and cigars is an extensive enterprise and as a tobacco market it ranks among the leading centers. Other manufactures include paper, baking powder, furniture, hardware,

clothing, carriages and wagons, fertilizers, flour, and farming implements. Large interests are vested in manufacturing brick and tile. The streets are lighted with gas and electricity. Extensive systems of sewerage and waterworks are maintained.

HISTORY. Captain John Smith bought a tract of land from the Indians in 1609 and founded a settlement near the site of Richmond. Fort Charles was built in the vicinity in 1645. The name was changed to Richmond in 1733, when the town was platted, and it was incorporated in 1742. In 1775 it was the place of meeting for the famous assembly in which Patrick Henry took a leading part. It was made the capital of Virginia in 1739, when it was only a small village. Here was ratified the Federal Constitution in 1778, and in 1799 the celebrated Virginia Resolutions were passed. Richmond was made the capital of the Confederate states in 1862, which it continued to be until 1865. During the Civil War it was the objective point of the Federal armies in the East and in its vicinity were fought a large number of pitched battles and skirmishes. The Confederate forces evacuated the city on April 2, 1865, when the warehouses were set on fire by order of General Ewell. Subsequent to the war it was rebuilt rapidly and has since continued to increase in wealth and population. Population, 1908, 115,844; in 1910, 127,628.

RICHMOND, Leigh, clergyman and author, born in Liverpool, England, Jan. 29, 1772; died May 8, 1827. He was the son of a physician, graduated from Cambridge in 1794, and soon after became curate of Brading in the Isle of Wight. Later he secured an appointment as chaplain to the Locke Hospital in I - lon, but in 1805 became rector of Turvey, Bedfordshire, a position he held until his death. Richmond is noted as a prominent supporter of the British and Foreign Bible Society and as the author of "The Dairyman's Daughter," a work translated into twenty different languages. Other writings are "Young Cottager" and "Negro Servant." In 1814 his writings were collected and published under the title of "Annals of the Poor."

RICHTER (rik'ter), Eugene, statesman, born in Düsseldorf, Germany, July 30, 1838; died March 10, 1906. He studied at Bonn and Berlin and became identified with the liberal party. In 1867 he was elected to the Prussian house of deputies and two years later became a member of the Imperial Diet, where he attained to leadership of the progressives. He opposed the state control of railroads, the protective tariff, and the colonial policy of the government, hence was an opponent of Bismarck on many occasions. Besides being authority on financial questions, he is the author of many works of a political nature. His books include "Political A, B, C Book," "The Future of Social-Democracy," "Recollections of the Reich-

stag," and "Errors of the Social Democratic Party."

RICHTER, Hans, German musician, born in Raab, Hungary, April 4, 1843. His father held an important position in the cathedral of Raab at the time young Richter was born. He entered the Conservatorium in Vienna in 1859, where he played the horn in the orchestra of the Kärnthnerthor Opera. He was made conductor of the National Theater in Munich in 1868, of the National Theater at Pesth in 1871, and of the Court Opera Theater in Vienna in 1875, which position he held until 1898. In the last mentioned year he became conductor of the Manchester Philharmonic Society. Richter played in many of the leading cities of Europe and may be considered one of the most eminent orchestra conductors of the early part of the 20th century. He is the most eminent authority on Wagner and Beethoven of recent times. He died Dec. 6, 1916.

RICHTER, Johann Paul Friedrich, usually called Jean Paul, noted author, born in Wunsiedel, near Baireuth, Germany, March 21, 1763;

died Nov. 24, 1825. His father was a school-teacher and died while the son was attending the gymnasium at Hof. He entered the University of Leipzig in 1780 to study theology, but there became deeply interested in literature and sciences. Poverty caused him to leave the university in 1784, when he returned to live with



JEAN PAUL RICHTER.

his widowed mother at Hof, and engaged as private tutor to teach the children of several wealthy families. In the meantime he published his first composition, "The Praise of Folly," but his writings were not favorably received until 1793, when he published "The Invisible Lodge," a romance relating to experiences in the life of a school-teacher. From that time his success was assured and his books became the most widely read in Germany.

In 1801 Richter married Caroline Mayer, daughter of Professor Mayer of Berlin, and the two spent some years in travel, visiting Goethe, Schiller, Wieland, and Gleim. He settled at Baireuth, in Bavaria, in 1804, where his time was spent in great industry and marked domestic happiness. In his later years he became afflicted with total blindness and the death of his son, Max, in 1821, weighed heavily upon him. Richter is the author of a number of works written in a deeply reflective style, but in many of them he mingled rare humor, and was able to describe scenes from nature with remarkable accuracy and ease. Few writers are more really poetic in their prose writing, and none outrank him in originality and interest. Among his writings not named above are "Hesperus," "Flower, Fruit and Thorn, "Dream of the Dead Christ," "Parson in Jubilee," "Biographical Recreations Under the Cranium of a Giantess," "Titan," "Wild Oats" (Flegel Jahre), "Life of Quintus Fixlein," "Levana, or Rules of

Culture," and "Rules of Aesthetics."

RICKETTS, James Brewerton, soldier, born in New York City, June 21, 1817; died in Washington, D. C., Sept. 22, 1887. After graduating from the West Point Military Academy in 1839, he served on the frontiers and at the beginning of the Mexican War accompanied the American army, serving in several important battles. He was made brigadier general of volunteers in 1861. He served with the army of the Potomac until the surrender of Lee and took part in the battles of Bull Run, South Mountain, Antietam, and the Wilderness, and the siege of Petersburg. In 1867 he retired from the army with the rank of major general. He served on courts-martial from that time until January, 1869.

RIDDER, Herman, journalist, born in New York, N. Y., March 5, 1851. He studied in the public schools and engaged in the insurance business. In 1878 he established the Catholic Volksblatt, a journal devoted to general and religious news, and in 1886 founded the Catholic News. He became manager of the New York Staats-Zeitung in 1890, and was made president of the same in 1907. In the meantime he developed much influence in politics. In 1908 he was chosen treasurer of the Democratic national campaign committee. He died Nov. 1, 1915.

RIDDLE (rid'd'1), a proposition or question put in obscure terms to excite curiosity and exercise the ingenuity in discovering its meaning. Riddles may be regarded fables put in the form of questions, and like them they originated with primitive people. They have been perpetuated in the folklore of the peasants. In ancient times fables were used to enhance investigation and to exercise at least some degree of influence in disciplining the mind. This is illustrated by the mythology of Greece and many of the sacred writings, of which the riddles proposed by Samson to the Philistines and those attributed by Josephus to Solomon are good ex-In the Middles Ages there was a marked disposition to construct and propound riddles as a pastime or for intellectual exercise, but the practice was limited greatly by the Reformation and has now gone entirely out of use in the more highly civilized countries. A tendency to use riddle making as a merry pastime still prevails in some of the countries of Western Asia. Many books on riddles have been published, the most noted collection being the German work issued in 1883, known as Ohnesorgen's "Sphinx." An example quoted here will, perhaps, serve as an illustration, namely: "What is the worst bestowed charity one can give?" Answer: "Alms to a blind man;

for he would be glad to see the person hanged who gave it to him."

RIDEAU (rē-dō'), a river of Ontario, which rises in Lake Rideau and, after a course of about sixty miles toward the northeast, flows into the Ottawa River at the City of Ottawa. It is important as a link in the Rideau Canal, which was completed in 1834. This waterway extends from the city of Ottawa to Kingston, on the Bay of Quinte, an inlet from Lake Ontario. It utilizes the Rideau River and Rideau Lake, and extends toward the southwest by way of Mud Lake and the Cataraqui River. The canal has 47 locks, is 127 miles long, and has a depth of about five feet. Formerly it was of much importance, but it is now little used, owing to the construction of railways and other canals.

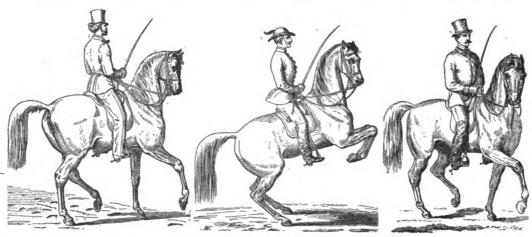
RIDGWAY (rij'wā), Robert, ornithologist, born in Mount Carmel, Ill., July 2, 1850. He attended the public schools of Illinois, and later was appointed zoölogist on the United States geological exploration of the fortieth parallel in 1867-69, under Clarence King. In 1877 he published a section on ornithology in the government report of the expedition, which was based on his collection of information regarding reptiles, fishes, and birds observed between Sacramento and Salt Lake City. In 1880 he became curator in the United States National Museum at Washington, and for some time was president of the American Ornithologists' Union. His writings embrace several hundred books and reports, of which "Birds of North and Middle America," in eight volumes, is the most important. Other publications are "A History of North American Birds," "Manual of North American Birds," "Water Birds of North America," "Nomenclature of Colors for Naturalists," and "Report on Ornithology of the Fortieth Parallel.

RIDING, the art of training domestic animals, especially horses to fit them to be ridden for pleasure and for traveling. Horsemanship was first developed upon a high plane in the Orient, especially in Arabia and Persia, where the horse has been highly esteemed from remote antiquity. The Arabian steeds were noted for their agility and endurance throughout the historical period. The long stretches of pastoral lands made the horse of especial value in traveling rapidly for long distances, while the camel served more particularly for extended tours through the desert. Horsemanship was a highly developed art among the Grecians, who employed the horse in festivals and for riding, and it was afterward introduced into Rome and the countries of Western Europe. Riding continued to be a favorite mode of traveling until modern times, when it was replaced largely by the use of steam and electricity. However, it continues to be a wholesome athletic pastime, in which the principal muscles of the body are called into active play and the organic functions are greatly stimulated. Although riding is limited to short trips in North America, it still continues to be an important factor in the sports and athletic exercises of Europe.

Horses have three natural paces, known as walking, trotting and galloping, but they may be quickened and beautified by training. The head should be held backward in a graceful position by the reins, the step should be shortened, and the animal should be trained to move with spirit. An upright position should be assumed by the rider, who should be provided with spurs and a short riding whip. The saddle should be well fitted to the horse and the stirrups need to be adjusted to the requirement of the rider. Considerable practice is needed to accustom the body to the natural position of riding, but this is soon acquired by those who exercise the art daily or several times per week. See Horse; Race.

RIDLEY (rǐd'lĭ), Nicholas, noted leader of the Reformation, born at Unthank, Northumdeath of Edward VI. he delivered a sermon at Saint Paul's Cross in opposition to Mary, declaring her illegitimate and predicting her ascension detrimental to England. He was arrested shortly after in accordance with the proclamation issued by Mary and committed to the Tower. Cardinal Pole named a commission to try Ridley for heresy, and in March, 1554, he was found guilty and sentenced to death. Efforts were made to cause him to recant, but he remained steadfast and along with Latimer was burned at the stake in Oxford.

RIDPATH (rǐd'pàth), John Clark, educator and author, born in Putnam County, Indiana, April 26, 1840; died in New York City, Sept. 30, 1900. He first attended the common schools, but in 1859 entered De Pauw University, from which he graduated with honors. After serving as principal of the Thorntown Academy, he became professor in Baker University, Kansas, in 1867, and in 1869 was called to the chair of



POSITIONS AND MOVEMENTS IN RIDING ON HORSEBACK.

berland, England, about 1500; suffered martyrdom Oct. 16, 1555. After attending the grammar school of Newcastle-upon-Tyne he entered Cambridge University, where he was ordained priest in 1524. The spirit of the Reformation had already spread in various parts of England, but he was more forcibly imbued with the new doctrines by spending three years in France, after which he returned to England and arduously taught the reformed faith. In 1530 he became undertreasurer of Cambridge University, and shortly after signed the decree of that institution against papal jurisdiction in England. He was appointed king's chaplain in 1540, elected master of Pembroke College, Cambridge, the same year, and in 1545 became a canon of Westminster. In 1552 he visited Princess Mary at Hunsdon, but, failing to persuade her to leave the Catholic faith, he concurred in the proposals to exclude her from the throne, giving his support to Lady Jane Grey instead. Soon after the

English literature in De Pauw University. Later he became professor of history and political philosophy, and in 1879 was made vice president of the institution. During this period he succeeded in raising the university endowment to \$2,000,000 and in 1885 resigned to devote his whole time to literature. His first book appeared in 1875, entitled "Academic History of the United States," and the following year he published his "Popular History of the United States." He contributed to many magazines, and was for a time editor of the Arena, of Boston. In 1896 he was a candidate for Congress on the Democratic ticket in his home district in Indiana, but was defeated by a small majority. "Great Races of Mankind" is one of his leading works, on which he was engaged for ten years in preparing the material and four years in writing the work. Other publications include "Life and Work of Garfield," "Life and Times of Gladstone," "Life and Work of James G. 2419

Blaine," "History of all Nations," and "Cyclopaedia of Universal History." He edited "The Ridpath Library of Universal Literature."

RIEL (re-el'), Louis, public man, born at Saint Boniface, Manitoba, Oct. 23, 1844; died Nov. 16, 1885. He descended from French and Indian parentage, was educated for the priesthood in the Roman Catholic Seminary at Quebec, but did not take orders in the church. In 1869 he became the leader of the Red River Rebellion, which broke out after the Northwest Territory was purchased by the Canadian government from the Hudson's Bay Company. The settlers at that time numbered about 12,000 and they considered themselves ignored in the reorganization of civil affairs. The malcontents organized a provincial government and took possession of Fort Gary, now Winnipeg, but Colonel Wolseley was sent to the seat of trouble with a force of 1,440 men in 1870. Riel fled to the United States, but returned to his native country soon after, where he was elected to the Dominion Parliament in 1873 and again in 1874 for the district of Provencher. He attempted to take his seat, but was expelled. In 1878 he formed a conspiracy with the Fenians to conquer the northwest, and in 1884 became president of a provisional government that had been established at Saint Laurent, near the Saskatchewan River. General Middleton was sent to capture the headquarters at Batoche. Riel was soon captured and convicted of high treason at a trial in Regina, where he was condemned to death and hanged.

RIENZI (rê-ĕn'zê), Cola di, eminent statesman, born in Rome, Italy, in 1313; died Oct. 8, 1354. He descended from humble parents, but was endowed by nature with remarkable power of oratory, and secured the advantages of a liberal education, including instruction in rhetoric, history, philosophy, and poetry. His ambition to free Rome from the thraldom of the nobles was first excited when his younger brother was assassinated by a Roman nobleman, and he was even more aroused because punishment of the offender was impossible. In 1343 he joined Petrarch and visited the court of Pope Clement VI, at Avignon, where he described the tyranny of the nobles in a remarkable oration. It was through the offort of Petrarch that Rienzi was given a favorable hearing, and subsequently he received an appointment as notary to the chamber of Rome. For three years he advocated reform without avail, but in 1347 he took advantage of the governor's absence from the capital and successfully planned a revolution.

Rienzi, as a means to form a concerted movement, held an assembly of his friends on Mount Aventine, where he proposed a plan of government that he called the *Good Estate*, and induced them to subscribe an oath in support of it. With a hundred horsemen and the support of the Pope's legate he made his way to the capitol, where the title of tribune was conferred upon him by the people. The common people having attained an easy triumph, he banished a number of the nobles from Rome, and amid great rejoicings the proclamation went forth that the Eternal City would again revive its former glory and power. At first successful, he was confirmed in authority by the Pope, but the powerful nobles still opposed him bitterly, while the necessary taxes for the support of the government excited opposition among the common classes.

In 1348 Rienzi was compelled to withdraw from Rome after a reign of seven months. He fled to Naples and afterward spent several years with the Franciscans in the Apennines. He ventured a second time to attempt the deliverance of Rome by applying, in 1350, to Charles IV., Emperor of Germany, for assistance, but that sovereign was unfavorably impressed with his schemes of revolution and delivered him to Pope Clement as a prisoner, who held him captive for three years. Innocent VI. not only released him, but decided to assist Rienzi in crushing the Roman nobles, hoping thereby to rid himself of a demagogue named Boroncelli. Rienzi immediately raised a large body of soldiers and made a triumphal entry into Rome, where much rejoicing was occasioned by his return. However, the barons opposed him by fortifying themselves in their castles, and he abandoned public concern for good living. His administration was attended by many disturbances and after a rule of two months he was attacked at the capitol by a crowd of people and was put to death under great indignities.

RIESENGEBIRGE (re'zen-ge-bêrg'e), or Giant Mountains, a mountain group of Europe, situated between the upper courses of the Elbe and Oder. It forms the boundary between Germany and Bohemia. The range covers an area of 425 square miles, most of which is in Austria. Schneekoppe is the culminating peak and the loftiest mountain in southeastern Germany, having a height of 5,260 feet. Iron, granite, and metamorphic slate are abundant in these mountains.

RIETSCHEL (rēch'el), Ernest, sculptor, born at Pulsnitz, Germany, Dec. 15, 1804; died Feb. 21, 1861. He studied art at the Dresden Academy, where he was awarded several prizes for his drawings, and afterward was a pupil of Rauch in Berlin. The government of Saxony granted him a stipend in 1827 and subsequently he traveled and studied art in Italy. He was made professor at the Dresden Academy in 1832, which position he held until his death. As a sculptor he holds a very high place among the artists of Europe and he is the founder of the Dresden School of Plastic Art. He executed busts of Luther and Rauch, statues of Dürer, Goethe, and Holbein, and celebrated monuments of many prominent men. The last mentioned include the monument of Luther at Worms and the Goethe-Schiller monument in Weimar. Among his other works are "The Christ Angel," "The Muse of Music," and "An Epoch of Civilization."

RIFLE (rī'f'1), the name of any firearm that has grooves in the surface of the bore, but usually the name is applied only to the arm that has superseded the musket. The firearms that were made originally for hand use consisted of long tubes without any lock, and were fired by means of a slow match or a live coal. They were at first laid on a wall or wooden frame, but later a handle was added for holding them up against the arm or shoulder. It was found soon after that the smooth bore in the barrel is not conducive to good results, since not only a part of the explosive force of the powder is lost, but there is a downward pressure in the barrel which tends to cause the ball to move forward in a direction different from that indicated by the barrel. Hence, a barrel with a smooth bore does not make it possible to shoot with accuracy at any great distance.

The first material improvement was made in the 15th century by providing these weapons with straight grooves, but in 1520 Augustus Koster, of Nuremberg, Germany, found by experimenting that a spiral groove imparts rotation to the projectile and increases the accuracy of the weapon. Since then the barrels have been rifled in that manner, the number of grooves and twist of the spiral varying according to the intended use. The rapidity with which the bullet revolves depends entirely upon the character of the twist in the spiral and the force of the explosion, but the most important effect of the revolution is to cause the ball to move forward in a line with the barrel. In this the ball is subject only to the force of gravity, by which it is eventually brought to the ground.

It is to be observed that there is a difference between the balls formerly used and those now generally employed, in that the former were round, while the latter are elongated. Balls of the elongated type first came into use in 1851 and are the invention of Captain Minié of the French army, who is the inventor of the Minié rifle. The bullets first used by him had a hollow base, and the explosion of the powder caused them to expand and take on a form at the surface resembling the inner mold of the gun. There was some advantages in this particular gun, but its heavy weight caused it to be discarded for the Enfield rifle in 1853. This rifle was lightened materially by reducing the bore to .58 of an inch in diameter. The Enfield rifle was used in the British army until 1865, when it was converted into a breech-loading firearm by attaching to it a breech-loading mechanism. The United States adopted the Springfield rifle, a firearm with a caliber of .58 inches, in 1855, which was used to a considerable extent throughout the Civil War, though a large number of Enfield rifles were employed. A short time before the Franco-German War of 1870-71 the German army was supplied with the celebrated needle rifle, which was the first arm of this kind to acquire a reputation in warfare. It proved an efficient aid in the military contest so detrimental to France.

Rifles used at present by the leading nations are not only grooved spirally, but are breechloading and repeating. Though the repeating rifle is not new, it has been improved within recent years. The Spencer rifle was among the first of the repeating kind and has a supply of cartridges in the stock of the arm, while the Winchester rifle has a tube under the barrel. All the newer rifles designed for rapid firing have a quantity of cartridges in a detachable magazine, which may be replaced as soon as emptied by one filled with a new supply of cartridges. German Mauser-Mannlicher rifle is a typical repeater of modern make. The cartridges are issued in packages of five and are placed in a tin or sheet-iron loading case. A magazine immediately in front of the trigger receives the case through an opening. When adjusted, the top cartridge is in position to be pushed into the chamber of the gun by a forward motion of a bolt. A spring presses and holds the case in position as long as any cartridges remain, but, when the last cartridge is pushed out by the bolt, the case drops through by its own weight and is then replaced by another. Other modern rifles are made somewhat differently, but in effect they produce practically the same results.

The United States adopted the Krag-Jorgensen rifle, an implement of German manufacture, in 1896, which was superseded in 1904 by a newer pattern of the Springfield rifle. With the standard pattern of this firearm it is possible to dispatch 45 shots per minute, the ball traveling at the rate of 2,310 feet per second when it leaves the muzzle and speeding a distance of fully 4.560 yards. The Mauser-Mannlicher is used in Germany; the Lee-Metford, in England; the Mannlicher, in Austria and Holland; the Mauser in Belgium, Spain, and Sweden; the Lebel, in France and Turkey; the Mauzin, in Russia; and the Schmidt, in Switzerland. Rifles employed in warfare have a much longer barrel than those used for sporting, since long range and powerful penetration are not desired for shooting game.

RIGA (rē'ga), a seaport of Russia, capital of the government of Livonia, on the Duna River, six miles from the Gulf of Kiga. It is connected with other trade emporiums by railroads, has well-paved streets, and is the seat of an excellent cathedral. The streets are broad, except in the older part, and all are lighted by gas and electricity. It has an extensive system of rapid transit and numerous monuments and parks. The noteworthy buildings include the commercial exchange, the Church of St. Peter, the governor's residence, the public library, the seminary for priests, and the central railroad stations. Among the manufactures are cotton and

woolen goods, leather, soap, starch, machinery, pottery, and tobacco products. It has a large trade in lumber, cereals, and live stock. Riga was founded in 1201 and was long an important member of the Hanseatic League. It was annexed to Poland in 1561, but became a Swedish possession in 1621 under Gustavus Adolphus. Since 1710 it has been a part of Russia. The Germans bombarded it successively and finally captured it without resistance in 1917. Population, 1914, 388,385.

tion, 1914, 388,385.

RIGA, Gulf of, an inlet from the Baltic Sea, in the western part of Russia. It is about 100 miles long and 65 miles wide. At its entrance is the island of Oesel. It receives the water of the Düna River.

RIGGS, Elias, missionary, born in New Providence, N. J., Nov. 19, 1810; died Jan. 20, 1901. He graduated from Amherst College in 1829, attended Andover Seminary, and in 1832 went as a missionary to Athens, Greece, under the American Board of Missions. After several years of successful work in the vicinity of Athens, he located in Smyrna, Asia Minor, and in 1853 was transferred to Constantinople. In the meantime he aided in revising the translation of the Bible into the Bulgarian and Turkish languages, and in 1857 came to New York to publish his own translation of the Bible into the Armenian language. While in America he lectured in the Union Theological Seminary, but soon returned to his field of labor in Asia. His published works include "Grammar of the Modern Armenian Language," "Manual of the Chaldee Language," "Grammar of the Bulgarian Language," "Bulgarian Bible Dictionary," and "Grammar of the Turkish Language."

RIGGS, Kate Douglas Wiggin, author, born at Philadelphia, Pa., Sept. 28, 1857. She studied at Abbott Academy in Andover, Mass., and removed to California. In Los Angeles she studied kindergarten methods and organized the first free kindergartens for poor children on the Pacific coast. In 1895 she married George C. Riggs, but continued to use the name of Kate Douglas Wiggin in her literary work. Her chief books include "Froebel's Gifts," "Nine Love Songs and a Carol," "A Summer in a Cañon," "The Birds' Christmas Carol," "The Story of Patsy," "Rebecca of Sunnybrook Farm," and "Rose o' the River."

RIGGS, Stephen Return, missionary, born in Steubenville, Ohio, March 23, 1812; died Aug. 24, 1888. He labored for many years under the direction of the American Board of Missions, particularly among the Dakota Indians. In 1862 he was compelled to withdraw to Fort Snelling on account of the Sioux War, and became chaplain in the expedition sent by the government against its Indians soon after. Beloit College conferred a divinity degree upon him in 1872. Besides aiding in translating the Bible into the language of the Dakotas, he published "Grammar and Dictionary of the Dakota Language."

RIGHT OF WAY, the privilege to pass over land belonging to another, either permanently or for a brief time, according to the nature of the easement. A right of way is said to be private when it is enjoined by a certain person or class of persons, while one that is open for general use is termed a public right of way. A highway is a public right of way, while a road reserved for special use is a private right of way. Tracts of land occupied by electric and railway lines may be classed with private rights of way, since the ownership is vested in a particular person or company, although they are used for conveying goods and persons by particular modes. A right of way may be established by an act of legislation, or by the owner dedicating a tract of land to the public.

RIGI (re'ge), or Righi, a noted mountain of Switzerland, located between Lakes Zug and Lucerne, in the canton of Schwyz. It is 5,910 feet high and is one of the most scenic and beautiful peaks of Switzerland. The summit is reached by two rack-and-pinion railways.

RIIS (res), Jacob August, journalist and author, born at Ribe, Denmark, May 3, 1849. He studied in his native country, but came to America at the age of twenty. After working in New York City as a carpenter and cabinetmaker, he engaged as police reporter for the New York While working in that capacity he took an active interest in promoting tenement house and school reform, and gave aid to the movement which resulted in establishing small parks in many parts of the city. His books include "How the Other Half Lives," "The Making of an American," "Out of Mulberry Street," ' Peril and the Preservation of the Home," "The Battle with the Slums," and "Theodore Roosevelt, the Citizen." He died May 26, 1914.

RILEY (rī'lĭ), James Whitcomb, American poet, born in Greenfield, Ind., Oct. 7, 1853. His father was a successful business man of Green-

field and intended to have the son study for a profession, but he tired of his studies and became a sign painter. Later he joined a theatrical company, with which he traveled for some time, and in the meantime gave attention to preparing comic songs and revising plays. He began contributing both prose and verse to periodicals in 1875,



JAMES WHITCOMB RILEY.

and soon after engaged with the Indianapolis Journal as a regular writer. After several years he located in Greenfield, where he devoted his entire time to literary work, both as a writer of poems and as a public reader. The writings of Riley are very numerous, including many in the

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hoosier dialect, while others are sentimental, tender, and prosaic. Few recent writers have been able to touch the popular taste so successfully, a fact evidenced by the large sale of his books and the great demand made upon him as a public reader. His works include "Afterwhiles," "Old Swimmin' Hole," "Green Fields and Running Brooks," "Pipes o' Pan at Zekes-"Boss Girl," "Poems at Home," "Character Sketches and Poems," "Child World,"
"Rhymes of Childhood," "Out to Old Aunt
Marys," "An Old Sweetheart of Mine," and "Neighborly Poems." He died July 22, 1916.

RIMINI (rē'mē-nē), a city of Italy, on the Adriatic Sea, seventy miles southeast of Bologna, with which it is connected by a railroad. It is located on a fertile plain, on the banks of the Marecchia River, and contains a large number of monuments and historic buildings, including a cathedral adorned with sarcophagi. Among the manufactures are wine, glass sailcloth, clothing, and pottery. It has a considerable trade in agriculture products and merchandise. The city has several hospitals, a number of schools, and a public library of 30,000 volumes. About ten miles northwest of the city is a monumental pillar to mark the spot where Caesar stood at the time he addressed his army shortly before he crossed the Rubicon. Rimini had an unimportant history during the Middle Ages. It was attacked successively by barbarians, but for some time was important as an independent republic, its independence ending when Charlemagne annexed it to the papal territory. The independence of Italy and the construction of its railroad have given it a new era of prosperity. Population, 1916, 44,830.

RINDERPEST (rin'der-pest), or Cattle Plague, the name of an infectious fever among cattle, which is prevalent to a greater or less extent in some parts of Europe and Asia. Rinderpest is the German name and some localities it is known as steppe murrain. It is caused by a minute microbe, or organism, and it has its seat in the digestive organs of cattle, though it sometimes attacks other ruminant mammals. The early symptoms include a high fever and rapid beating of the pulse, and later the mouth and respiratory organs become affected, viscid secretions are discharged, and death ensues after five or six days. Since from 30 to 60 per cent. of the animals die under any treatment, it is best to promptly destroy or isolate all diseased animals. Russia has experienced several widespread epidemics of this disease, and it has appeared in a less extensive form in Austria, Turkey, and the Philippines.

RING, an ornament worn on the finger from remote antiquity, usually made of some metal chiefly of gold or silver. The signet ring was worn in ancient times as a sign of confidence or to indicate authority. Later rings came into use as articles of ornaments among the civilized nations, especially among the Jews and Persians, who practice using betrothal and wedding rings. These frequently contain precious stones of great value. Rings as tokens of marriage came into almost universal use in Christendom and many were engraved with mottoes to indicate some sentiment, either of friendship or affection. The practice of wearing earrings is more recent, but rings seem to have been worn as adornments of the arms at a very early date. People low in the scale of civilization not only wear finger and arm rings, but they employ them as adornments to decorate the nose, ears, and toes. Some look upon a ring as a charm against evil, hence wear it a given number of days without removal. The Pope uses what is known as a fisherman's ring which is engraved with the picture of Saint Peter in a boat. With this ring the briefs are sealed. It is broken at the death of the Pope and his successor is presented with another by the city of Rome.

RINEHART (rin'härt), William Henry, sculptor, born in Carroll County, Maryland, Sept. 13, 1825; died in Rome, Italy, Oct. 28, 1874. He was the son of a farmer and spent his boyhood in assisting at farm work and attending public school. Later he worked at stone cutting in the neighborhood. He went to Baltimore in 1846 as an apprenticed marble worker, and afterward studied in the Maryland Institute. His success caused him to be placed at the head of the ornamental department in a marble yard, and in 1855 he went to Italy to study sculpture and come in touch with Italian art, settling while there in Florence. After receiving instruction for two years, he returned to Baltimore and brought with him two bas-reliefs made while abroad, entitled "Night" and "Morning." He was employed by the government to execute a fountain figure for the post office in Washington, and the two figures that support the clock in the House of Representatives-"Indian" and "Backwoodsman." remaining a few years in America, he settled permanently in Rome, where he continued working at his art until his death. Rinehart was an artist of superior talent and was philanthropic, leaving a fund of 45,000 to aid art students. His works include a statue of Chief Justice Taney, in Annapolis, Md.; "Latona and her Children, in the Corcoran Gallery, Washington; and "Love Reconciled with Death," in the Greenmount Cemetery, Baltimore. Other productions include "The Woman of Samaria," "Clytie," and "Rebecca."

RING OUZEL (oo'z'l), a species of thrush s found in Europe, which resembles in size and appearance the blackbird. It is migratory, moving far northward in Europe and Asia in the spring, and passing to the Mediterranean region and Africa in the fall. A crescent of white extends across the lower part of the neck, while the general color of the male is blackish and of the female a dark brown. These birds do damage to cherries and other small fruits when ripe, but they also feed on insects and worms. Their nests are built in a clever manner of clay and grass, and usually from four to six eggs are laid. After the young are reared, they generally gather in flocks.

RINGWORM, a skin disease that appears in the form of circular patches. It is caused by a microscopic fungus parasite. The parasite preys upon the epithelial coverings of the skin, chiefly on the scalp, but also on the body. In men it affects the skin in the vicinity of the beard, especially on the chin and lower lip. It is both chronic and contagious. The best treatment consists in removing the hair and applying

sulphurous acid, iodine, or glycerin.

RIO DE JANEIRO (rē'ò da zha-nā'rô), the capital and metropolis of Brazil, on the southeastern coast, 75 miles southwest of Cape Frio. It stands on the western shore of the Bay of Rio de Janeiro, in which it has a magnificent harbor, one of the most beautiful and most secure in the world. The section along the bay is level, but it stretches westward over the slopes of low hills, and presents an appearance of remarkable beauty when viewed from the sea. The streets are well platted, though only a few have firstclass pavements, while many of the buildings are small and of inferior architecture. Within recent years modern facilities have been supplied, such as telephones, electric and gas lighting, public baths, and electric street railways, but the city has long been noted for its beautiful gardens and parks, waterworks, and churches. Among the most noteworthy buildings are the capitol, the national museum, and the cathedral. It has numerous asylums, hospitals, and educational institutions. The College of Pedro II. was founded in 1837. Other institutions of learning include the Imperial Academy of Medicine, the National Educational Museum, and the Polytechnical Institute. It has several military, naval, art, and normal schools. The national library has 248,500 volumes and is open to the public. Another noteworthy feature of the city is its excellent water supply, with which are connected numerous fountains in the streets and public squares. Many of the public places are ornamented with statues and monuments.

The Bay of Rio de Janeiro was discovered in 1555 by the French, who formed a small settlement on the present site of the city, but it was captured by the Portuguese in 1567. Rio de Janeiro has always ranked as the most important trade center of Brazil. It is not only the chief military arsenal and political center of the republic, but it has fully one-half of the export and import trade of the country. The export trade consists largely of coffee, lumber, and minerals, and is estimated at a value of \$60,000,000 annually. The imports include mostly manufactured articles, though local enterprises are rapidly stimulating home production. Among the manufactures are furniture, tobacco products, cotton and woolen goods, metalware, glass, paper, pottery, and leather. Several railways furnish communication with the interior and railroad facilities are maintaned at Nitcheroy, on the opposite side of the bay, with which Rio de Janeiro is connected by ferry lines. The country surrounding the city produces immense quantities of lumber, live stock, coffee, and tobacco. Population, 1916, 1,148,640.

RIO GRANDE (re'o gran'da), a river of North America, which has its source in the San Juan Mountains of Colorado and, after a general course of 1,800 miles toward the southeast, enters the Gulf of Mexico a short distance below Brownsville, Tex. It is shallow in most of its course and is navigable only about 500 miles from its mouth. The channel is almost due north and south in New Mexico, where it receives the Puerco River, and thence forms the boundary between Texas and Mexico. The most important tributary is the Rio Pecos, in Texas. In Mexico it receives the Rio Conchos, the Rio Salinas, and the Rio San Juan. Brownsville, Tex., and Matamoras, Mexico, are the chief towns on its banks.

RIO NEGRO (nå'grô), a large river of South America, one of the chief tributaries of the Amazon. The source is in the plains of southeastern Colombia, thence it flows east to the boundary of Venezuela, makes a curve toward the south, and, after receiving the Dos Upes River, flows southeast and joins the Amazon at Manaos, Brazil. The entire course is 1,250 miles, much of which is navigable. Large forests are contiguous to the Rio Negro, direct communication is maintained between the Rio Negro and the Orinoco by the Cassiquiari, thus joining the Orinoco and Amazon river systems into a great commercial route. Rio Negro is likewise the name of a large river of Argentina, south of which is the region known as Patagonia. The source is in the Andes Mountain of Chile. In its course, which is 700 miles, are many rapids and waterfalls. It flows into the Atlantic Ocean at about 41° south latitude.

RIOT (rī'ŭt), a tumult or disturbance of the peace by three or more persons, who assemble of their own authority to resist public officials or destroy public or private property. The assembly may be premeditated or spontaneous and it may have for its purpose to terrorize the public, or to carry out some process of a public character in an unlawful manner. Sometimes a mere frolic, as in a charivari, results in a tumultuous and terrifying riot. If three or more persons enter upon the execution of what ordinarily constitutes a riot, but fall short in carrying out their purpose, their offense is termed a rout. Rioting is prohibited by statutory law and the punishments prescribed include a fine and imprisonment or both.

RIPARIAN RIGHTS (rǐ-pā'rǐ-an), the name applied to the right and privileges of those whose lands border upon or are bounded by

streams or rivers. Navigable bays, arms of the sea, and rivers are in most cases considered public highways, but the owners usually have the right of access, wharfage, and ferriage. In some countries the owner of land lying upon an unnavigable stream owns the bed of such stream to its center, while in others he has only the right to use the water under certain circumstances. For instance, he is not permitted to waste or pollute the stream, to divert the channel, or even to use all the water to the exclusion of other owners farther down the course. Even where a private stream runs through a premises, a part of the course being exclusively upon the property of a single owner, it cannot be polluted or used in a manner that would operate an injury to others.

RIPLEY

RIPLEY (rīp'lī), George, author and journalist, born in Greenfield, Mass., Oct. 3, 1802; died in New York City, July 4, 1880. He first attended public schools and graduated from Harvard University in 1823. After studying theology in the Cambridge Divinity School, he became pastor of a Unitarian Church in Boston, in 1826. In 1840 he resigned his charge, lived for some years in Europe, and founded the Transcendental Magazine. Subsequently he originated the Brook Communistic Farm, which he abandoned in 1847 and removed to New York as a staff editor of the Tribune. He contributed to a number of magazines, and published the

"American Cyclopaedia." RIP VAN WINKLE, the name applied by Washington Irving to the hero of a legend published in 1820, which has taken a place among the classics of America. Almost all nations have a tradition about some sleeper who falls into the embrace of Morpheus and after a long period of dormancy awakens to marvel at the changes written in the sands of time. Among the noteworthy incidents of this kind handed down by tradition are the seven sleepers of Mount Celion, who slept 250 years. Nourjahad, wife of the Mogul emperor Geangir, who discovered the otto of roses, slept seven years. Epimenides, the Gnostic, is said to have slept 57 years.

Rip Van Winkle, according to the account given by Washington Irving of the legend, was a Dutch colonist of New York, who was noted at home as a good-natured, but idle and henpecked husband. It was his custom to spend much of his time in the quiet inn kept by old Nicholas Vedder instead of attending his patch of maize and potatoes, just at the outskirts of the little village on the Hudson River. Sorely tried by his scolding wife, he set out with his gun and dog for a hunt in the forests of the Catskill Mountains. In a wild glen among the rocks he met Hendrick Hudson and his strange crew of the Half Moon, whom he aided in carrying a keg of liquor. The strange company played ninepins in mysterious silence, and as the balls rolled together they caused sounds nearly resembling peals of thunder, which lost none of their mystery as they bounded and reëchoed among the mountains. Rip became the waiter of this strange company, and as he drank of the sparkling liquid a deep stupor came over him until at length he fell into a sleep, from which he awoke only after a lapse of twenty years.

On awakening one pleasant summer morning, Rip found his dog gone and the firelock by his side was almost destroyed by rust. His beard had grown to an unusual length. On returning to his native village, he found strange faces on the streets and new names over the doors. His wife was dead, his own house was in decay, and the people who surrounded him looked upon him with distrust. At length he was recognized as Old Rip, who had disappeared mysteriously some twenty years before. Strangest of all is the realization that the quiet Dutch inn of Nicholas Vedder had been changed into the Union Hotel, and that before it was a painting of George Washington, instead of George III., due to the fact that the American Revolution had made him a citizen of an independent country. The story has been dramatized by a number of Americans, the most popular being the one of 1865, with which the name of Joseph Jefferson is associated.

RISTORI (res-to're), Adelaide, or Marquise del Grillo, eminent tragic actress, born in Cividale, Italy, Jan. 26, 1821; died Oct. 9, 1906. She was the daughter of strolling players and thus became connected with the stage from infancy. In 1835 she appeared in the play entitled "Francesca da Rimini" and won great admiration and popularity. She played in Rome in 1849, but an attack by the French army caused her to enter a hospital as army nurse. Soon after the war she appeared in a number of leading Italian cities, and in 1855 played in Paris. Subsequently she made a tour of Canada, the United States, Mexico and South America. Her rôles meeting with greatest favor include Lady Macbeth, Mary Stuart, and Marie Antoinette.

RITTER (rit'ter), Carl, eminent geographer, born in Quedlinburg, Germany, Aug. 7, 1779; died Sept. 28, 1859. After studying at Halle, he was made professor of geography at the University of Berlin in 1820, and subsequently became connected with the military school as director. The work of Ritter, both as a teacher and author, has had a marked influence upon the study of geographical science, since he originated methods that were not known before his time. He deserves particular mention because of systematically accounting for the formation of rivers, glaciers, mountains, and other natural phenomena, associating with each geographical phenomenon such historical, geological, and physiological facts as render the whole interesting and more or less concrete. His principal writings include "Geography in its Relation to Nature and the History of Man," "History of Geography," "General Geography," "Geographical and Historical Comparison of Europe," and "Architectural Monuments."

RITUAL (rit'ū-al), a book which contains the prayers and ceremonials of any kind, such as are used in churches, civic societies, or similar formal organizations. The term ritualism is generally applied to the extensive development of church ceremonials in the Church of England, especially as it came to be associated with the service of the Holy Communion by the High Church party about 1863. The purpose was to make the services more ornate and to employ a larger measure of the symbolic. In a general sense, ritualism may be said to embrace a system of conducting public worship according to prescribed forms, as distinguished from a system in which the form of worship is left chiefly to the discretion of the person in charge. Rituals are used largely in the Anglican, Roman, Greek, and several other churches.

RIVER, a stream of considerable size, usually formed of several brooks or creeks. It may flow into another river, a marsh, or some large body of water, as a lake, a gulf, or an ocean. Rivers are caused by drops of water falling upon the land, some of which sink into the surface and form springs and rivulets, while portions run down the slopes of the land and give rise to rills. The rivulets and rills usually combine with others and form creeks, which finally merge into a river. The land bordering on the sides of a river constitutes its banks. When descending a stream, the right bank is on the right hand and the left bank is on the opposite side. The depression in which it flows is called its bed, or channel. Other streams uniting with it are called its affluents, or tributaries. The place where it begins is its source, and where it ends, its mouth or débouchure. A region or district drained by a system of streams is termed a river basin and the division between two or more river systems is called a divide, or watershed. When two or more streams unite at the same place, as the Allegheny and the Monongahela at Pittsburg, they are said to form a junction.

Most rivers flow from higher land into lakes or into the sea, but many streams in arid countries either evaporate or the water sinks into the ground, such as the Humboldt River of the United States. The steepest slope is usually near the source and the most gentle near the mouth, but in many instances the head streams are in a flat country, as in the case of the Mississippi, and in others the rivers flow over escarpments in the lower course, as the Potomac and other streams of the Piedmont Plain. Large quantities of earth and rock are eroded by the action of the running water, but this effect depends upon the character of the channel and the rapidity of the flow. Where the bed offers considerable resistance, as in the Niagara, great falls and rapids result. In many instances the larger rivers flow into the sea or lakes by a slow current, as the Nile and the Mississippi, which gives rise to deltas. This is true likewise of the Saint Lawrence, but it has no delta for the reason that the silt is dispersed or carried away by high tides or oceanic currents.

Rivers are of vast importance in the history of mankind, since they supply means of transportation and drainage, thus causing the rise of important cities and the growth of nations. They were even more important in the economic and political conditions of nations formerly than at present, since the building of railroads has made it possible for many manufacturing and commercial cities to develop importance even at considerable distances from the ocean or rivers, though it must be admitted that nearly all the great cities of the world are supplied with water navigation facilities.

Below is a table showing the length and area of some of the principal rivers:

NAME.	MILES IN LENGTH.	AREA OF BASIN, SQUARE MILES.
Mississippi-Missouri, N. A	5,545	1,600,000
Nile, Africa	4,100	1,425,000
Amazon, S. A.	3,500	2,500,000
Yang-tse-kiang, Asia	3,200	950,000
Yenisei, Asia	3,000	1.100.000
Lena, Asia	2,775	950,000
	3,000	1.300,000
Mississippi, N. A	3,000	1,600,000
Cambadia Asia	2,625 2,800	955,500
Cambodia, Asia		
Amur, Asia	2,739	200,000
Hoangho, Asia	2,700	750,000
Niger, Africa	2,000	800,000
Volga, Europe	2,400	550,000
Obi, Asia	3,000	1,200,000
Colorado, N. A	1,200	230,000
Mackenzie, N. A	1,900	575,000
Yukon, N. A	2,000	200,000
Rio Grande, N. A	1,800	245,000
Brahmaputra, Asia	1,800	575,000
Indus, Asia	1,800	375,000
Danube, Europe	1,750	315,000
Tocontins, S. A	1,700	350,000
Irtish, Asia	1,625	412,000
Murray, Australia	1,125	270,000

RIVER LAND SETTLERS, a name applied to settlers on so-called Des Moines River lands in the State of Iowa. These lands embraced each alternate section of the public lands remaining unsold, or otherwise undisposed of, in a strip five miles wide on each side of the Des Moines River from its mouth to the north line of the State. They were granted to aid the Territory of Iowa in the improvement of the navigation of the Des Moines River. The settlers in many instances held patents or other evidences of title issued by the government subsequent to the grants. Some were evicted and others held continuous possession. Litigation involving the title to these lands continued over a period of nearly fifty years and ended in 1892.

Congress in 1893 passed an act to indemnify those settlers, their heirs, or assigns, holding patents or other evidences of title from the United States, who had been in continuous possession, and those persons, their heirs, or assigns, holding written evidences of title from the United States who had been evicted, and, third, those persons whose chain of title ran back to the per-

son making the original entry and who had purchased the paramount title.

In July, 1898, Congress passed an act appropriating additional funds and included those settlers who had in good faith filed preëmption or homestead claims, made settlement, and resided upon their lands for a period of not less than five years, unless sooner evicted, cultivated and made valuable improvements upon the land claimed, and in cases where such persons made actual settlement in good faith under the preëmption and homestead laws at a time when others were permitted to file on like lands and in good faith resided upon the same for a period of not less than five years, and who did not abandon said lands or procure title to other public lands.

RIVERSIDE, a city of California, county seat of Riverside County, on the Santa Ana River, 65 miles east of Los Angeles. It is on the Atchison, Topeka and Santa Fé, the Southern Pacific, and the San Pedro, Los Angeles and Salt Lake railways. The surrounding country is devoted to farming and fruit growing, especially figs, lemons, oranges, and grapes. Among the noteworthy buildings are the public library, the courthouse, the high school, and many fine churches. Wine, clothing, canned fruits, and machinery are among the manufactures. It has systems of public waterworks and sanitary sewerage. The first settlement in its vicinity was made in 1870, and it was incorporated in Population, 1900, 7,973; in 1910, 15,212. 1883.

RIVES (rēvz), Amélie, author, born in Richmond, Va., Aug. 23, 1863. She was educated under private tutors and in 1888 married John Armstrong Chanler of New York, from whom she was divorced. Later she married Prince Troubetzkoy, a Russian dignitary. Her writings are very numerous and some have been translated and widely read in Europe. They include "Virginia of Virginia," "The Quick or the Dead," "A Brother to Dragons," "Herod and Mariamne," "The Witness of the Sun," and "Barbara Dering."

RIVIERA (re-ve-a'ra), meaning seashore, the name applied in Italy to a region bordering on the Gulf of Genoa. It is properly separated into two divisions, the western coast, or Riviera di Ponente, and the eastern coast, or Riviera di Levante. This region has beautiful scenery and may be reached by a railroad traversing the coast.

RIXDORF (rĭks'dôrf), a city of Germany, in Prussia, situated immediately south of Berlin, with which it is connected by steam and electric railroads. The principal buildings include the city hall and courthouse, the post office, the central railroad station, and the public library. Among the manufactures are cotton and woolen goods, furniture, rubber and gutta-percha, linoleum, machinery, and scientific instruments. It is the seat of a noted school of agriculture and mechanic arts. The place was founded by Friedrich William I. in 1737. A large majority of the

inhabitants are Protestants. Population, 1905, 153,513; in 1910, 237,378.

ROACH, John, shipbuilder, born in Mitchellstown, Ireland, in 1815; died in New York City, Jan. 10, 1887. In 1829 he emigrated to America. He first worked as a machinist and later became the founder of important iron works. At the time of the Civil War he constructed six monitors and a number of large engines for the government. In 1871 he established the works of the Delaware River Iron Shipbuilding and Engine Company at Chester, Pa., an institution covering about 125 acres. It is one of the most noted of America and many large vessels, engines, and boilers have been constructed here.

ROAD, an open passage appropriated to public traffic, forming a line of communication for public use. The construction of highways is a matter of public concern and varies according to the state of civilization and the resources of the country through which they pass. Highways of an excellent quality were built by the Romans, which were in fact pavements resting on a foundation of rough stones consolidated into one mass by mortar or grout. However, they designed them on systems so that they centered into particular cities, instead of making them general, thus contributing largely to build up particular towns as trade emporiums. The roads as a whole were in a poor condition in Europe until the rise of the western powers, France and Germany taking an advanced rank in road making. It may be said that a marked change in road building has taken place since railroad construction began. Nations do not now expend as much time and money in highway building, but instead vest their construction and maintenance largely in local authorities.

Roadways are in a very backward condition in most of the Spanish-American countries, but there are notable exceptions, as in Cuba, where many of the highways are exceptionally well graded and macadamized. In Canada and the United States road building is a local matter. The work is done partly under county supervision in some instances, but generally it is under town or township superintendence. Congress authorized the construction of a national road westward from Boston in 1796, which passed through Pennsylvania, Ohio, and Indiana, but the construction of railroads caused it to fall into a state of neglect, though this particular road is still well graded. In hilly regions and many of the older settlements of North America, the roads do not conform to the direction of the compass, but in the newer sections the roads are located a distance of one mile from each other, thus dividing the land by straight lines into squares. This is true in general in the upper part of the Mississippi valley and in the south central part of Canada, where each section of land usually is surrounded by a road.

In road building it is necessary to take into account such natural obstructions as streams,

swamps, and hills, these requiring either bridges, embankments, grades, or tunnels. The breadth of the right of way usually is 66 feet, or four rods, and the width of the grade depends upon locality and traffic, though as a rule it is sufficiently wide for the passage of teams in all places. The advent of the bicycle and automobile has made the necessity of good roads even more apparent than formerly. Associations to promote the building of good roads are maintained in some localities, under whose direction new methods are studied and object lessons are given in the art of building culverts, grades, bridges, and other improvements that enter into the construction of a good road. It is customary for the driver to keep to the right when meeting vehicles and in driving on roads that cross each other, the right of way belongs to the driver who first reaches the intersection. It is obligatory on all persons driving upon the highway to exercise reasonable care in the safety of foot passengers and bicycles. The latter are considered to be in possession of a vehicle within the meaning of the law, and are entitled to one-half the improved road on an equal footing with drivers of other vehicles.

ROAD RUNNER, a bird of the cuckoo family, so named from its habit of running rapidly. The bill is long and slightly compressed, the head has an erectile crest, and the tail feathers are stiff and long. Some of the species are nearly two feet long and have a tail ranging from ten inches to a foot. The color is copper or bronze-green, with naked colored skin around and behind the eyes. This bird is frequently seen upon the roads ahead of carriages, and it is able to run faster than the fleetest horse. Although it lives chiefly upon the ground, it is very shy. Locally it is called snake killer and chaparral cock. Several species are native to Mexico and the southwestern part of the United States.

ROANOKE (rō-à-nōk'), a city of Virginia, in Roanoke County, 250 miles west of Norfolk, on the Norfolk and Western Railroad. It is pleasantly situated on the Staunton River, which joins the Dan River at Clarksville to form the Roanoke River, and is surrounded by mining and agricultural country. The noteworthy buildings include the public library, the Rebekah Sanitarium, the high school, and the Virginia Female College. Among the manufactures are tobacco products, machinery, ironware, locomotives, cars, and hardware. In its vicinity are a number of mineral springs possessing medical value. It has electric railways, public waterworks, sanitary sewerage, and pavements of brick, macadam, and asphalt. Originally it was called Big Lick, but was incorporated as Roanoke in 1884. Population, 1910, 34,874.

ROANOKE, a river of the United States, formed in southern Virginia by the confluence of the Staunton and Dan rivers, and, after a course of 255 miles toward the southeast, flows

into Albemarle Sound. It is navigable to Weldon, N. C., a distance of 150 miles.

ROBBERY (rob'ber-y), the crime of taking money or goods from the person of another, or in his presence, against his will, with force or violence. It differs from larceny in that robbery is accompanied by violence or intimidation and is committed in the presence of the owner. This crime is termed highway robbery when it is committed by taking property from travelers. The punishment is various, depending upon the conditions under which the offence is committed. If the offender is armed with a dangerous weapon at the time of such robbery, the penalty is severe. In most cases an assault with an intent to rob is punishable by confinement in prison. Robbing or attempting to rob a passenger train is punishable in some countries by imprisonment for life.

ROBBIA (rob'be-a), Della, the name of a celebrated family of Italy, whose members produced many fine works of Florentine art. Luca della Robbia, born in 1399, is noted as the originator of famous productions in terra cotta. These works were coated with an enamel as a protection against the influence of the atmosphere. He died in 1482. His nephew and pupil, Andrea della Robbia (1435-1525), is celebrated for his ability to give a lifelike modeling to the human form. One of his productions, representing the last judgment, is in the church of San Girolamo, at Volterra, Italy.

ROBERT I. (rob'ert), King of Scotland. See Bruce.

ROBERT II., King of Scotland, born March 2, 1316; died April 19, 1390. He was the son of Marjory, daughter of Robert Bruce, and Walter, steward of Scotland, hence the first of the Stuart kings. Both his parents died while he was yet an infant, but he was recognized as heir to the crown by Parliament in 1318 and, after the death of David II., in 1371, was formally crowned at Scone. In 1384 Scotland was invaded by the Duke of Lancaster, and the English made a second invasion under Richard II. in 1385. Robert made a retaliatory expedition into England in 1388, which culminated in the Battle of Otterburn on July 21,

ROBERT III., King of Scotland, eldest son of Robert II., born in 1340; died April 4, 1406. He was crowned king in 1390. At first the government rested largely in the hands of his brother, Earl of Menteith. Scotland was invaded by Henry IV. of England in 1400, but he soon withdrew his forces. The following year a Scotch army under Archibald Douglas made an expedition into England, which resulted in the defeat of the Scots at the Battle of Homildon Hill, in 1402. James, second son of Robert, was sent to France in 1406, but was captured by the English and retained for some time as a prisioner by Henry IV. This so grieved the king that he died at Rothesay soon after.

ROBERTS, Brigham Henry, author and statesman, born in Warrington, England, March 13, 1857. He came to the United States in 1866 and settled in Utah, where he graduated from the normal department of the Utah University in 1878. Being a member of the Mormon Church, he married three times before polygamy was abolished in 1890. He served as a member of the Utah constitutional convention in 1895 and in 1898 was elected to Congress, but opposition to his admission as a member on account of his polygamous relations soon This opposition took form in a petition signed by 7,000,000 persons, asking that he be denied a seat in Congress. Roberts defended his claim for admission with marked ability, but when it came to a vote, in 1900, he was excluded on roll call, the vote being 268 in favor of exclusion out of a total of 318. Roberts contributed to many periodicals and magazines and traveled extensively. Among his published works are "Life of John Taylor, Third President of the Mormon Church," "New Witness of God," "Outlines of Ecclesiastical History," and "The Gospel."

ROBERTS, Charles George Douglas, poet, born at Douglas, New Brunswick, Jan. 10, 1860. He studied at the Fredericton Collegiate School and subsequently attended the University of New Brunswick. From 1883 to 1884 he edited The Week at Toronto and in 1885 was made professor of English and French literature in King's College, Nova Scotia. After serving efficiently for two years, he was elected protessor of economics and international law in the institution and resigned in 1895 to devote himself to literary work. He became connected editorially, in 1897, with the Illustrated American published at New York. Many of his writings deal with animal life. His works in prose embrace "By the Marshes of Minas,"
"Around the Camp Fire," "The Forge in the
Forest," "The Kindred of the Wild," "The Heart of the Ancient Wood," and "A History of Canada." He produced a number of poetic works, including "Songs of the Common Day," "In Divers Tones," "Orion and Other Poems," and "Book of the Native."

ROBERTS, David, painter, born at Stockbridge, Scotland, Oct. 24, 1796; died Nov. 25, 1864. He took up the study of decorative painting at an early age, but later devoted much time to the picturesque in architecture. For a number of years he studied at the Trustees' Academy, Edinburgh, and soon after settled in London, where he was a scene painter. In 1824 he made a tour of Europe, Palestine, and Egypt, and in 1841 was made a Royal Academician. As an architectural painter he takes rank among the leading artists of England. The ruined buildings and Gothic cathedrals were his favorite themes. His leading works include "Statue of Memmon at Sunrise," "Church of the Holy Nativity at Bethlehem," "The Holy Land and

Syria," "The Destruction of Jerusalem," "Rome and Saint Peter's at Rome," and "London from the Thames."

ROBERTS, Sir Frederick Sleigh, British military leader, born in Cawnpore, India, Sept. 30, 1832. He was educated in England, studying at Eton and Addiscombe, and in 1851 entered the army as second lieutenant. His first actual experience in war was in the siege and capture of Delhi, in 1857, where he was wounded, but later he took part in the engagements of Lucknow, Cawnpore, and Malka. In 1867 he joined the Abyssinian expedition, accompanied the the Lushai expedition of 1871-72, and in 1878 was made commander of the Kuram division of the army. He commanded an expedition for the relief of Kandahar, for which purpose he traversed a hostile mountainous region for over 300 miles, from Kabul, Afghanistan, in a period of twenty days and succeeded in crushing Ayub Khan at the end of the march. He commanded the army of Madras from 1881 to 1885, becoming commander in chief for India in the latter year. He was raised to the peerage in 1892, and in 1895 was appointed to command the forces in Ireland. In 1899 he superseded Sir Redvers Henry Buller (born in 1839) as commander of the British forces in South Africa, and in 1900 became commander in chief of the army, succeeding Field-Marshal Wolseley, thus attaining the highest position in the British army. He received many distinguished honors and titles, among them an earldom from Queen Victoria in 1901. He commanded in France in 1914, dying there Nov. 14, 1914.

ROBERTSON (rob'ert-sun), Frederick William, eminent clergyman, born in London, England, Feb. 3, 1816; died Aug. 15, 1853. He descended from Scotch parents, attended the grammar school of Beverley, and in 1832 entered the Edinburgh Academy. In 1837 he graduated from Oxford University and the following year became curate of Saint Maurice, but resigned on account of ill health and traveled in various countries of Europe. After returning to England, he became curate at Cheltenham, in 1842, and five years later was made incumbent of Trinity Chapel, Brighton, a charge he filled successfully until his death. Robertson attained eminence by his originality, human sympathy, and industrious habits, always presenting his themes with marked interest. He was accused of being unorthodox because of his views on baptism, inspiration, and the atonement, and his friendship for the working classes caused the more aristocratic to assail his preaching as being socialistic and democratic. He is the author of a number of works on religion and founded the Workingmen's Institute in Brighton. "Lectures on the Influence of Poetry on the Working Classes" is one of his best known works.

ROBERTSON, James, soldier and pioneer, born in Brunswick County, Virginia, in 1742; died in 1814. His parents removed to North

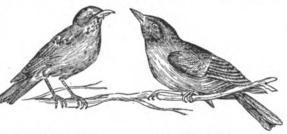
Carolina, where he became acquainted with Daniel Boone. In 1770 he accompanied the latter on a trip into Tennessee, where he aided in founding the Watauga Association, which was the first compact to form a government west of the Allegheny Mountains. He was an influential member of the settlement and was conspicuous in operating against the Indians. In 1778 he and Richard Henderson purchased a tract of land and founded the city of Nashville, which later became the capital. He was made brigadier general when Tennessee was organized as a Territory, in 1791, and after its admission as a State he served in the Legislature. In the War of 1812 he did much to retain the friendship of the Indians and prevent them from joining the British.

ROBESPIERRE (ro'bes-per), Maximilien Marie Isidore, eminent statesman, born in Arras, France, May 6, 1758; guillotined July 28, 1794. After studying in the schools of his native town he entered the College of Louisle-Grand in Paris, where he graduated. Later he studied law and established himself as an advocate in Arras. In 1783 he became a member of the Academy of Arras, and in 1789 was elected a deputy to the assembly of France, where he became distinguished as an advocate of democracy. Though a man of under stature and a shrill voice, he was a powerful influence and exerted himself as a leader of revolutionary clubs, particularly of the Jacobins. It may be said that he

represented the spirit and history of the Revolution after the death of Mirabeau, since his power was almost unlimited. In 1791 he became public accuser of the new courts of judicature, and, after the dissolution of the assembly, he visited Arras, but returned soon after to plan the massacres of 1792, though remaining in the background, while Marat and Danton carried out his designs. He was elected first deputy of Paris in the same year and shortly became a member of the convention that was to determine the fate of Louis XVI.

As a member of that body the efforts of Robespierre were tireless in favor of executing the king, which took place in December, 1792. Soon after followed his memorable contest with the Girondists, by whom he was made an object of attack. In this struggle he was supported by many leaders who wanted to give France preponderance in its contest with Europe and cared little for personal questions. The excitable events of that unfortunate period caused him to part friendship with Hébert and his associates, who were guillotined by a vote of the convention on March 19, 1794. He also differed from Danton and Camille Desmoulins, who were brought to the guillotine on April 5 of the same year. Robespierre was now completely in control and the Reign of Terror was inaugurated, but a party soon formed in the convention in opposition to him, and he was publicly accused of despotism on July 27, 1794. Soon after he was thrown into Luxemburg prison, but the keeper released him the same night, and his supporters collected for his defense in the Hall of Commune. A force of arms under Barras was sent for hi, arrest the following day. At the sight of bayonets he was deserted by his followers and taken before the tribunal, where he was speedily convicted as an outlaw. The next day he was guillotined along with 23 of his supporters, including Saint-Just and Couthon.

ROBIN, or Robin Redbreast, the name applied to several species of birds of the warbler family, which are native to Europe. They are so named from the red breast of the male, the female having a breast of a yellowish-brown color. The robin in America is a species of thrush and is much larger than the redbreast. It is ten inches long, has a black head and back,



ROBIN REDBREAST.

GOLDEN ROBIN.

and the breast is chiefly of an orange color. The female is duller than the male. It is migratory, reaching the northern states and Canada in the spring. Two broods of young are reared each year, usually from four to six in each brood, and they return to the same locality the following season. Robins are familiar birds and have a pleasantly modulated song.

ROBINSON (rob'in-sun), Edward, biblical scholar, born at Southington, Conn., April 10, 1794; died Feb. 5, 1863. He graduated at Hamilton College, Clinton, N. Y., and was a teacher in classical studies at that institution until 1821. While there he assisted in publishing and translating a number of texts in the classical languages. In 1826 he went to Germany to study at Göttingen and Berlin and in 1830 became an instructor at Andover, Mass. Subsequently he was professor in Union Theological Seminary. New York, where he labored continuously from 1837 until his death. He made several tours of Europe and Palestine and published a physical geography of the Holy Land. His second wife, Theresa von Jakob (1797-1869), whom he married in 1828, was the daughter of a distinguished professor at Halle. She wrote a number of excellent works under the name of Talvi. Her publications include "Folk Songs of the Servians" and "The Black Dwarf." edited a number of works written by her hue

band and translated from several European languages.

ROBINSON CRUSOE. See Juan Fer-

ROB ROY, meaning Robert the Red, celebrated Scottish outlaw, born in 1660; died Dec. 28, 1738. His true name was Robert McGregor, but he assumed the name of his mother's family, that of Campbell, because the Scotch Parliament, in 1662, had outlawed the McGregor clan. His estate was on the east side of Loch Lomond, where he engaged extensively in rearing and training cattle, but in the rebellion of 1715 he supported the cause of the pretender. Previous to this he had borrowed money of the Duke of Montrose, but his financial losses made him unable to repay it, and the duke took advantage of the opportunity by depriving him of his estate. He became desperate on account of his misfortune and gathered a band of followers to make reprisals upon the property of the duke, driving away his cattle and consuming the grain harvested by his tenants. The English stationed a garrison at Inversnaid to apprehend the intruder, but they were unable to capture him or prevent his marauding raids. A reward of \$5,000 was offered for his head, when he found shelter in a cave of Ben Lomond. Later he became reconciled with the duke and lived peaceably at salquhidder, where his death occurred. In 1817 Sir Walter Scott published his celebrated novel, "Rob Roy," in which the daring exploits of this famous character are recounted.

ROC, or Rukh, in Arabian and Persian mythology, a huge bird, capable of carrying off an elephant and devouring it. It is mentioned in the "Arabian Nights' Entertainments" and, according to Adolf Erman, was suggested by the fossil tusks of a giant bird. In the Middle Ages a general belief prevailed in the existence of such a bird, a fact borne out by a number of writings coming down to us from that period. The first knowledge of this myth spread in Europe soon after the first Crusade.

ROCHAMBEAU (rô-shām-bō'), Jean Baptiste Donatien de Vimeur, Count of, eminent soldier, born in Vendôme, France, July 1, 1725; died May 10, 1807. He secured a liberal education for the priesthood, but entered the army in 1742, and in 1749 became governor of Vendôme. In 1780 he came to America as the head of a body of French troops to aid the colonists in the Revolution against England. He established his headquarters at Newport, R. I., thence marched, in 1781, against a detachment of Clinton's army, which he defeated on Manhattan Island, and later joined Washington's army in the siege of Yorktown, aiding efficiently until the war ended by the surrender of Cornwallis. Soon after he returned to France, where he became a deputy to the assembly in 1788 and in 1791 was created field marshal. During the French Revolution he was imprisoned as an opponent of Robespierre, and the death of the latter saved him from the guillotine. Napoleon created him grand officer of the Legion of Honor in 1804.

ROCHDALE (roch'dal), a city of England, in Lancashire, ten miles north of Manchester. It is situated on both sides of the Roch River, has extensive railroad connections, and is surrounded by a country which is rich in deposits of coal and building stone. Among the manufactures are cotton and woolen goods, machinery, hats, hardware, and pottery. A cathedral dating from the 12th century is the most conspicuous building, but it has many fine modern structures, such as hospitals, schools, and churches. The commercial trade is enhanced by canal and railroad connections with many trade centers of northern England. It has electric street railways, public waterworks, and stone and macadam pavements. Anciently it was known as Recedam. Population, 1911, 91,437.

ROCHEFORT (rôsh-fôr'), a city of France, in the department of Charente-Inférieure, eighteen miles southeast of La Rochelle. It is situated on the Charente River, nine miles from the sea, and is strongly fortified. The harbor is well improved with wharves and by dredging and has extensive dockyards. It has a fine marine hospital, several schools and colleges, and a growing trade in merchandise and cereals. The manufactures include cannon, clothing, sailing vessels, furniture, and machinery. Rochefort was a fishing village until 1666, when Louis XIV. established a naval station and planned the fortifica-

tion. Population, 1916, 36,694.

ROCHEFORT, Victor Henri, journalist and statesman, born in Paris, France, Jan. 30, 1830. After attaining a liberal education, he engaged with the Paris Figaro as a writer of dramatic and art criticism, and later became a member of the editorial staff. In 1868 he founded La Lanterne, a periodical opposed to the empire, which was soon suppressed by the government and Rochefort fled to Belgium, where he continued the publication of his paper. He was elected to the legislative assembly from Paris in 1869, when he immediately returned to France, and soon after founded La Marseillaise. His course was favorable to a republic and he was again sentenced to imprisonment in 1870, remaining in confinement until the fall of the empire, as a result of the Battle of Sedan. After being liberated, he immediately became prominent in the government and in 1871 was elected deputy. He was charged with instigating the excesses of the Communists and was sentenced for life to New Caledonia, a French penal station in the Pacific Ocean, from which he escaped in 1873 and came to San Francisco, Cal. By the amnesty of 1880 he was permitted to return to France, where he was elected to the chamber in 1885, but resigned his seat the following spring. He published "Adventures of My Life." He died July 1, 1913.

ROCHELLE (rô-shěl'), La, a seaport of France, on the Atlantic, capital of the department of Charente-Inférieure, 95 miles northwest of

Bordeaux. It is strongly fortified, has railroad facilities, and maintains a commodious harbor. The streets are well planned and beautifully improved, many of them having fountains and monuments. Among the manufactures are sugar, glass, cotton goods, spirituous liquors, and machinery. The trade consists principally in wines, merchandise, and supplies intended for the colonies. Its ancient name was Rupella, meaning little rock, and it has been the seat of a number of important battles. At the time of the Reformation it was a stronghold of the Protestants. A Catholic army besieged it in 1573, but a treaty was concluded by which the Huguenots were granted liberty of worship. Population, 1916, 32,595.

ROCHESTER (roch'es-ter), a city in Minnesota, county seat of Olmsted County, on the Zumbro River, 35 miles south of Red Wing. Communication is furnished by the Chicago Great Western and the Chicago and Northwestern railroads. It is surrounded by a fertile farming and dairying country, which produces cereals and grasses. Rochester has large grain elevators, stock yards, flouring mills, and machine The noteworthy buildings include the shops. county courthouse, the high school, the opera house, the Saint Mary's Hospital, the Masonic Temple, the Odd Fellows' Hall, and the State Hospital for the Insane. It has systems of public waterworks and sanitary sewerage. Rochester was settled in 1854 and incorporated in 1858. Population, 1905, 7,233; in 1910, 7,844.

ROCHESTER, a city of New Hampshire, in Strafford County, on the Cocheco River, 76 miles north of Boston, Mass. It is on the Boston and Maine Railroad and has a large trade in merchandise. The chief buildings include the public library, the high school, and the Gaffney Home for the Aged. Among the manufactures are woolen goods, leather, boots and shoes, bicycles, machinery, and earthenware. The surrounding country is agricultural, and produces fruits and cereals. The place was settled in 1728 and incorporated as a city in 1891. Population, 1900, 8,466; in 1910, 8,868.

ROCHESTER, a city of New York, county seat of Monroe County, the third largest city of the State. It is situated on the Genesee River. seven miles from Lake Ontario and seventy miles northeast of Buffalo. Communication is furnished by navigation on the Great Lakes and by the Pennsylvania, the West Shore, the New York Central, the Erie, the Lehigh Valley, and other railroads. In the northern part of the city are extensive falls and rapids in the course of the river, which furnish an abundance of water power. The river is crossed by about ten bridges, some of which are over 200 feet above the stream. The river has a total fall of 257 feet within the city limits and the largest cataract has a descent of 95 feet. A stone aqueduct 850 feet long and 45 feet wide carries the Erie Canal across the river.

DESCRIPTION. Rochester has an elevation of 260 feet above Lake Ontario and 500 feet above sea level. It is regularly platted, the streets crossing each other at right angle, and it covers an area of twenty square miles. Beautiful lawns and avenues of shade trees give the residential part a fine appearance and many parks are well improved. The city has a park system of 700 acres. These include a number of small parks and squares in various parts. Those of the larger size are Highland, East and West Seneca, and Genesee Valley parks. Genesee Park, the largest in area, includes 340 acres. In East Seneca Park are fine zoölogical gardens and Highland Park has an extensive collection of shrubs and rare trees. In Washington Square is the Soldiers' and Sailors' Monument. Mount Hope Cemetery, one of the finest in the city, contains the grave of Frederick Douglass, and in one of the city squares is a statue to his honor. Many of the streets are paved with granite, asphalt, and macadam. They are well graded and drained, are lighted with gas and electricity, and contain an extensive system of drainage. Intercommunication is by electric railways, which extend to many interurban points and other cities, including Syracuse and Buffalo.

Buildings and Institutions. The architecture is modern and substantial. Among the principal buildings are the county courthouse, the city hall, the post office, the State arsenal, the chamber of commerce, the Masonic Temple, the Wilder building, the German-American building, and the Powers Hotel. It is the seat of a State industrial school, a hospital for the insane, the Western New York Institution for Deaf Mutes, and various scientific and educational associations. The leading institutions of learning include the University of Rochester, the Rochester Theological Seminary, the Wagner Memorial College, and the Saint Bernard's Seminary. Mechanics' Institute, a celebrated industrial school, has an attendance of about 4,225. The public school system is well organized and supplied with apparatus and libraries. The largest collection of books in the city include the Reynolds library, the Central library, and the Law library, the first mentioned having a collection of 60,000 volumes. All the leading denominations have fine church buildings and some of them maintain schools for the education of the youth.

INDUSTRIES. The manufacturing enterprises of Rochester are very extensive, due chiefly to its supply of water power and excellent avenues for distributing the products. It carries a large lake commerce, as well as an extensive inland wholesale and jobbing trade. The manufacture of flour is an important enterprise. Photographic apparatus and optical instruments are made in large quantities and the output is shipped to nearly all countries of the world. In its vicinity are extensive nurseries of shrubs, flower bulbs, and fruit trees. Clothing, boots and shoes, pipe tobacco and cigars, machinery, and furniture are

produced in large quantities. Other manufactures include vinegar, malt liquors, saddlery, lubricating oil, and farming implements.

HISTORY. The first settlement on the site of Rochester was made in 1810, when the land was owned by Nathaniel Rochester, after whom the city was named. In 1822 it was known as Rochesterville, when it contained only a few frame houses, and it was chartered as a city of Rochester in 1834. Trade was greatly extended by the opening of the Erie Canal in 1825, through which it became directly connected with Buffalo, Albany and New York City. It has had a rapid growth continously since the Civil War. Population, 1905, 181,666; in 1910, 218,149.

ROCKEFELLER (rŏk'ê-fĕl-lēr), John Davidson, capitalist, born in Richford, N. Y., July 8, 1839. His parents removed to Cleveland,



JOHN D. ROCKEFELLER.

Ohio, in his infancy, where he attended the public schools and in 1858 entered business on his own Well apaccount. plied industry and aptitude for affairs made it possible for him to succeed, though his means were at first limited. In 1860 he entered the petroleum business on a small scale, but soon be-

came proprietor of a refinery in Cleveland, and in 1870 was made president of the Standard Oil Company, a vast corporation of a monopolistic nature. Rockefeller is noted for his liberality in supporting educational and religious institutions, his gifts for that purpose amounting to millions of dollars. In 1889 he furnished the means to reconstruct the University of Chicago and made endowments to it that aggregate about \$23,515,322. Subsequently he greatly increased his gifts to this institution and gave large sums in support of Vassar College, Yale University, and a general board of education. In 1908 his company was fined \$29,240,000 at Chicago, Ill., by Judge Kenesaw M. Landis for gross discriminations in selling and shipping oil.

ROCKEFELLER, William, capitalist, born in Richford, N. Y., May 31, 1841. He began his business career as a bookkeeper, but soon joined his brother, John D. Rockefeller, in the oil business. In 1861 he became the head of the business in New York City and for some time was president of the Standard Oil Company. His business enterprises and investments yielded large returns, hence he may be classed with the leading capitalists of America. Besides extensive holdings in banks and mining companies, he invested heavily in stock of the New York Central, the Northern Pacific, the Chicago, Milwaukee and Saint Paul, the Delaware, Lacka-

wanna and Western, the Lake Shore and Michigan Southern, the Hartford and Connecticut, and other railroads.

ROCKET. See Fireworks.

ROCKFORD, a city in Illinois, county seat of Winnebago County, on Rock River, 86 miles northwest of Chicago. It is on the Illinois Central, the Chicago and Northwestern, the Chicago, Milwaukee and Saint Paul, and the Chicago, Burlington and Quincy railroads. The noteworthy buildings include the county courthouse, the Carnegie Library, the high school, the Saint Anthony's Hospital, the Rockford College for Women, and the Ransom Medical and Surgical Sanitarium. Power for industrial purposes is obtained by a dam across the river. The manufactures include pianos, furniture, clothing, cigars, sugar, flour, machinery, hardware, and dairy products. It has electric and gas lighting, sanitary sewerage, public waterworks and an extensive system of electric street railways. The surrounding country is noted for its fertility and the production of large quantities of dairy products. The place was settled in 1834 and incorporated as a city in 1852. Population, 1910, 45,401.

ROCK HILL, a city of South Carolina, in York County, eighty miles north of Columbia. It is on the Southern Railroad and is surrounded by a fertile fruit and cotton growing region. The Winthrop Normal and Industrial College of South Carolina is located here. It is the seat of the Catawba Military Academy. The manufactures include cotton textiles, flour, furniture, machinery, brick and pottery, and lumber products. Electric lighting, waterworks, and sewerage are among the public utilities. Population, 1900, 5,485; in 1910, 7,216.

ROCKINGHAM, county seat of Windham County, Vt., on the Williams River and on the Rutland and other railroads. The industries include paper mills, machine shops, and cotton mills. It has fine public improvements. The place was settled in 1750 and incorporated in 1875. Population, 1910, 6,207.

ROCKING STONES, or Logan Stones, the large stones that are poised so as to rock when pressure is applied. It is thought that this phenomenon is due in many cases to bowlders having been deposited by the action of glaciers, but some rocking stones have been formed by the action of wind, water, and other similar natural causes. The most remarkable example of this class is found in the rocking stone of Tandil, in Argentina, about 200 miles south of Buenos Ayres. It weighs 700 tons and is so nicely poised as to rock in the wind.

so nicely poised as to rock in the wind.

ROCK ISLAND, a city of Illinois, county seat of Rock Island County, on the Mississippi River, opposite Davenport, Iowa. It is on the Hennepin Canal and on the Chicago, Rock Island and Pacific, the Chicago, Milwaukee and Saint Paul, the Chicago, Burlington and Quincy, and other railroads. A fine bridge built by the government, costing .bout \$1,-

200,000, connects it with the opposite side of the river. Rock Island, an island in the Mississippi, contains the United States arsenal and armory, which covers about 1,000 acres. The streets are well paved and finely improved. It has extensive machine shops, foundries, and railroad roundhouses. Among the chief manufactures are cotton goods, ironware, wagons, glass, flour, lumber products, machinery and agricultural implements.

Rock Island has many fine buildings and beautiful houses. It is the seat of the Lutheran Augustana College, an institution founded in 1860, which has about 600 students. Other noteworthy buildings include the county courthouse, the Federal building, the public library, the high school, and the Saint Anthony Hospital. Rock Island is surrounded by a rich farming country, which contains deposits of bituminous coal. It has a growing trade in merchandise. The place was settled in 1834 and was incorporated in 1852. Population, 1900, 19,493; in 1910, 24,335.

ROCKLAND, a city in Maine, county seat of Knox County, on Penobscot Bay, 85 miles northeast of Portland. It is on the Maine Central Railroad and has a fine harbor. Among the features are the county courthouse, the public library, the Federal building, and many schools and churches. The chief manufactures are boots and shoes, clothing, boilers, sailing vessels, lime, and machinery. The surrounding country is fertile, producing cereals and grasses, and contains mineral deposits, mostly granite and limestone. In 1630 the first settlement was made in its vicinity. It was first known as East Thomastown, but the name was changed to Rockland in 1850. Population, 1910, 8,174.

ROCKLAND, a town of Massachusetts, in Plymouth County, 16 miles southeast of Boston. It is on the New York, New Haven and Hartford Railway and is a commercial and manufacturing center. The public library contains 12,500 volumes. It has electric lighting, waterworks, and several fine schools and churches. The manufactures include boots and shoes, hardware, clothing, and machinery. Originally it was a part of Abington, but was incorporated as a separate town in 1874. Population, 1905, 6,287; in 1910, 6,928.

ROCK RIVER, a stream that rises in Wisconsin, thence flows through Illinois and joins the Mississippi immediately south of Rock Island. It has a course of 375 miles and flows through a rich farming country. Among the cities on its banks are Janesville, Beloit, Rockford, Sterling, and Rock Island.

ROCKS. See Geology.

ROCK SPRINGS, a city of Wyoming, in Sweetwater County, 252 miles west of Laramie. It is on Bitter Creek and the Union Pacific Railroad and is surrounded by extensive coalmining districts. Electric lighting, waterworks, a public library, and a system of drainage are

among the public improvements. It has several fine schools and churches and is the seat of the Wyoming State Hospital. It is the center of a large trade in coal, clothing, lumber, and machinery. Population, 1910, 5,778.

ROCKVILLE, a city of Connecticut, in Tolland County, on the Hockanum River, fifteen miles northeast of Hartford. It is on the New York, New Haven and Hartford Railroad, and has an abundance of power from the river, which has a descent of 250 feet in the city. The supply of water is obtained from Snipsic Lake. Among the principal buildings are the public library, the high school, and many fine churches. It has manufactures of cotton, silk and woolen goods, paper, stationery, and machinery. The vicinity was settled in 1721, but the place was not platted until 1840. It was incorporated as a city in 1889. Population, 1910, 7,977.

ROCKY MOUNTAIN GOAT, a ruminant quadruped native to the Rocky Mountains, ranging from Idaho to the Arctic Circle. It is a beautiful animal, covered with long white



ROCKY MOUNTAIN BIGHORN.

hair, and its skin is valued in the market. The flesh is tender and nutritious. Its size is about that of the domestic goat, but the limbs are stronger and the body is heavier. The mane is erect, the horns are slightly curved, and the beard on the throat is quite like that of a goat, but it is a much finer looking animal. The Rocky Mountain sheep, or bighorn, is an allied animal. It has shorter hair and immense horns.

ROCKY MOUNTAINS, an extensive mountain system, embracing the most elevated peaks of North America. The name is sometimes applied to the entire mountain region in the western part of the United States, but it belongs more particularly to the eastern system of the Cordilleras of North America, extending from the southern part of New Mexico to the Arctic Ocean, terminating near the northeastern corner of Alaska. This portion of the western highlands extends from New Mexico in a northwesterly direction, has a length of more than 1,000 miles, and incloses several very

arid and elevated plateaus. It is widest at about the latitude of 40° and the trend is nearly parallel to the Pacific coast.

The principal ranges in New Mexico are the San Andres, Manzano, Gallinas, and Taos mountains. Castilla Peak, in the last named range, is one of the highest elevations, being 12,-615 feet above sea level. In Colorado many complicated ranges extend nearly parallel to each other, the most elevated peaks being Pike's Peak, 14,150 feet; Gray's Peak, 14,345 feet; Long's Peak, 14,275 feet; and Mount of the Holy Cross, 14,176 feet. The Laramie, Big Horn, and Shoshone mountains are among the ranges of Wyoming; Fremont Peak, in the Wind River range, is one of the most elevated peaks in Wyoming, being 13,570 feet. The Wasatch Mountains trend in many parallel ranges through Utah, and in the northern region of that State is an extensive lake system, including Great Salt Lake. The principal ranges include Gilbert Peak, 13,690 feet; Mount Hilgard, 11,460 feet; Mount Terrill, 11,600 feet; and Wheeler Peak, 12,075 feet. The lofty ranges of the Bitter Root Mountains form part of the boundary between Montana and Idaho, with connected ranges in each State and in Washington, whence the Rocky Mountain system passes into Canada.

In Canada it forms the boundary between Alberta and British Columbia, whence the principal ranges pass through the upper part of the latter and thence northwesterly through Yukon, with ranges trending westward into Alaska. The most elevated peaks of Canada include Mount Brown, 16,000 feet; Mount Hooker, 15,700 feet; Mount Logan, 19,514 feet; and Mount Saint Elias, 18,010 feet. The two last named are near the Alaska boundary and some distance northwest in Alaska is Mount Wrangel, 19,400 feet high. In 1901 the United States geological survey reported that Mount McKinley, height 20,464 feet, is the highest peak in territory belonging to the United States. It is situated about 200 miles northwest of Mount Wrangel, which was formerly considered the highest peak in Alaska.

The Rocky Mountains are rich in minerals, which include gold, silver, copper, iron, granite, coal, petroleum, and many others, and the region possesses some of the most extensive and productive mines in the world. The building of railroads in practically all parts of this mountain region has caused the rise of great cities, while settlers have been attracted there to establish productive vineyards, orchards, and farms. In many regions stock raising is a vast industry. Some portions are noted for their excellent scenery, particularly the Yellowstone National Park, in Montana, and the Rocky Mountain Park, near Banff, Alberta. The Missouri, Columbia, Colorado, Rio Grande, Arkansas, Mackenzie, Saskatchewan, Yukon, and other great rivers of North America have their source in the Rocky Mountains.

RODENTIA (rô-děn'shǐ-à), or Rodents, an order of mammals characterized by the incisors being shaped so they can gnaw with ease the hard vegetable substances upon which they principally feed, such as nuts, grains, and the bark of trees. The rodents, as they are frequently called, include about twenty families and several thousand species, such as the mice, rats, squirrels, beavers, agouti, rabbits, and lemmings. Most of the species are covered with fur, but some, as the porcupine, have spines. Some are aquatic, as the muskrat, and some live largely in trees, as several species of squirrels, but the greater number live upon or burrow in the ground. While many are injurious to agriculture or obnoxious pests to dwellings, many are valuable for the fur they bear. In these animals the brain is small, especially in those that feed strictly on herbs, but most of the species are characterized by great vigor and activity. Many fossil remains of rodents are found from the earliest Tertiary epoch, including many species that differ from the animals now in existence.

RODGERS (roj'erz), John, naval officer, born in Hartford County, Maryland, Aug. 8, 1812; died in Washington, D. C., May 12, 1882. He was a son of Capt. John Rodgers (1771-1838), who attained distinction by firing the first shot of the War of 1812. In 1828 he entered the navy and in 1853 secured command of the steamer John Hancock, then sent on an exploring expedition to the North Pacific. He commanded the monitor Weehawken in 1863, when that vessel captured the Confederate ironclad Atlanta, and was made commodore for his services. In 1869 he was given command of the China fleet as rear admiral and two years later captured several forts in Corea, thus ending the outrages perpetrated on American commerce off the Corean shore. He served as commander of Mare Island navy yard at San Francisco from 1873 to 1877, and in the latter year became superintendent of the United States Naval Observatory at Washington, a position he held until his death.

RODIN (rô-dăn'), Auguste, sculptor, born in Paris, France, in 1840. He descended from poor parents and became a marble worker. Afterward he became associated with an artist in the decoration of the chamber of commerce at Brussels. In 1875 he exhibited in the Salon and two years later produced a statue in plaster. While his early work met with much adverse criticism, he succeeded in attaining a reputation by improving on his early productions, especially in giving them a lifelike appearance and accuracy in details. He executed many busts that have been greatly admired, including those of Rochefort and Victor Hugo. Among his general productions are "The Kiss," "The Age of Brass," and "Saint John Preaching," now in the Luxembourg. He died Nov. 17, 1917.

RODMAN, Thomas Jefferson, soldier and

ROE

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inventor, born in Salem, Ind., July 30, 1815; died in Rock Island, Ill., June 7, 1871. He graduated from the West Point Military Academy, in 1841, and was immediately appointed lieutenant of ordnance. After experimenting with guns and gunpowder, he discovered a plan for casting large guns and cooling them from the inside. He is the inventor of several smooth-bore guns of large size and introduced mammoth powder as an effective agent. Guns of his invention were used in the army and navy during the Civil War and he had charge of the Watertown arsenal until 1865, when he was engaged to construct an arsenal on Rock Island, in the Mississippi, near Rock Island, Ill. He wrote "Experiments on Metals for Cannon and on Cannon-Powder.

ROE, Edward Payson, novelist, born in New Windsor, N. Y., March 7, 1838; died in Cornwall, N. Y., July 19, 1888. He studied at Williams College and later took a course at the Union Theological Seminary in New York City. After serving as chaplain in the Union army from 1862 until 1865, he settled as pastor of a Presbyterian Church in Highland Falls, N. Y., and in 1874 removed to Cornwall to devote himself to literature and the cultivation of small fruits. His novels are of considerable merit and have been read extensively in America and Europe. The first work from his pen, "Barriers Burned Away," appeared in 1872, and is a story of the Chicago fire. Other works embrace "Opening of a Chestnut Burr," "Nature's Serial Story," "He Fell in Love With His Wife," and "Miss Lou." "Success with Small Fruits" is a work on gardening, for which he gathered material from his own experience.

ROEBLING (rob'ling), Washington Augustus, civil engineer, born at Saxonburg, Pa., May 26, 1837. His father, John A. Roebling, was a German-American engineer and established extensive works at Trenton, N. J. The son graduated at Rensselaer Polytechnic Institute in Troy, N. Y., in 1857, and aided his father in building the suspension bridge across the Allegheny River. At the beginning of the Civil War he enlisted in a New York artillery company, was for some time on the staff of General Pope, and served as military engineer and bridge builder. He constructed a bridge across the Shenandoah River at Harper's Ferry in the second Bull Run campaign. Shortly after the war he superintended the construction of the railroad suspension bridge across the Ohio between Cincinnati and Covington, and in 1869 was given charge and superintendency of the New York and Brooklyn bridge. This immense structure had been commenced by his father, who died from an injury received while at work, and it was completed in 1883. He died April 14, 1912, losing his life in the wreck of the Titanic off Newfoundland.

ROEBUCK (rō'būk), or Roedeer, a species of deer native to the mountains of Southern

Europe. It is found only in the timbered highlands. Its weight is sixty pounds and it is about thirty inches high at the shoulders. The color is tawny-brown. Its tail is almost concealed in the hair and is characterized by a large, white anal disk. The horns are seldom over nine inches long and the flesh is valued as food, being considered better than that of the stag.

RÖENTGEN (rent'gen), William Conrad, German physicist, born in Holland, March 27, 1845. He graduated from the University of Zu-

rich in 1870, but when his favorite professor, Dr. Kundt, removed to Würzburg, he followed him to that city. In 1873 he removed to Strassburg, where he was made assistant professor. He became profes-sor of mathematics and physics in the Agri-



W. C. RÖENTGEN.

cultural Academy of Hohenheim in 1875, but returned to Strassburg University the following year. He was made professor and director of the University and Institute of Physics in Giessen in 1879, and in 1888 became professor of physics at Würzburg, Bavaria. Röentgen is the author of several works treating on the branches taught by him and the writer of numerous treatises for papers and magazines. In 1895 he attended the Würzburg Physico-Medical Society and announced a new kind of ray, which he called the X-Ray. This discovery of seeing and photographing what is ordinarily unseen excited universal attention, and is one of the greatest achievements of the latter part of the last century, its application in many respects being of great value. He was soon after summoned before the Emperor of Germany to exhibit his discovery, and was permitted to make a shadowgraph of the bones of the emperor's arms. The emperor soon after decorated Röentgen with the Order of the Royal Crown, and he was created a baron by Ludwig of Bavaria. Other discoveries made by him relate to the method of determining the intensity of sunlight, to the transmission of electricity through gases, and to the theory of flame sounds. See X-Rays.

ROGATION DAYS (rō-gā'shǔn), the three days immediately preceding Ascension Day; hence, they always occur on Monday, Tuesday, and Wednesday. They are observed with litanies, and in some places with processions, to obtain God's blessing on the crops and to invoke His assistance in times of public peril.

ROGERS (rŏj'ẽrz), Henry Wade, jurist and educator, born in Holland Patent, N. Y.,

Oct. 10, 1853. He graduated from the University of Michigan in 1874, was admitted to the bar, and was dean of the same school a number of years. In 1890 he was elected president of Northwestern University, Evanston, Ill., where he served efficiently until 1901, when he was made professor of law in Yale Law School, and became dean of the same in 1904. His publications include "Illinois Citations" and "Expert

Testimony."

ROGERS, John, sculptor, born in Salem, Mass., Oct. 30, 1829; died July 27, 1904. He was educated in his native city and at the Boston high school, after which he engaged as clerk in a mercantile house, but was compelled to change his occupation on account of weak eyesight. Soon after he was employed in a machine shop at Manchester, N. H., and in 1856 took charge of a railroad repair shop at Hannibal, Mo., where he practiced modeling in clay. He went to Europe to study art in 1858, and the following year went to Chicago, where he modeled his celebrated "Checker Players." His largest work is the equestrian statue of Gen. J. F. Reynolds, now before the City Hall in Philadelphia. His productions embrace many statues incident to the Civil War and home life. They include "The Slave Auction," "One More Shot," "Picket Guard," "Going for the Cows," "Coming to the Parson," and "The Favorite Scholar." A bronze group illustrating Irving's "Legends of Sleepy Hollow" is his finest work.

ROGERS, Randolph, sculptor, born in Waterloo, N. Y., July 6, 1825; died in Rome, Italy, Jan. 15, 1892. After attending the public schools, he engaged in mercantile pursuits, but in 1848 went to Europe to study sculpture for two years in Rome. After returning to the United States, in 1850, he conducted a studio in New York City until 1855, when he returned to Italy. His works are among the best known of those produced by American sculptors. They include "Genius of Connecticut," on the State capitol at Hartford; statue of John Adams, in Mount Auburn Cemetery; statue of William H. Seward, on Broadway, New York City; statue of Abraham Lincoln, in Philadelphia; and "Angel of Resurrection," on the monument to Col. Samuel Colt, in Hartford, Conn. The basreliefs representing scenes from the life of Columbus, now on the bronze doors of the capitol at Washington, are also by Rogers. Other productions include "The Lost Pleiad," "Group of Indians," "Boys Skating," "Ruth," and "Isaac." He executed portrait statues of Abraham Lincoln and William H. Seward.

ROGERS, Samuel, poet, born in London, England, July 30, 1763; died Sept. 18, 1855. He was the son of a London banker and, after receiving a careful education, entered his father's establishment as a clerk. In 1793 he became head of the firm. His first poetic work, "An Ode to Superstition," was published in 1786 and his best work appeared in 1792, entitled "Pleasures

of Memory." Soon after he retired from business, having accumulated considerable wealth, and devoted the remainder of his time to literary study and travel in Europe. His later productions include "Human Life," "Epistles to a Friend," "Voyage of Columbus," and "Table Talk." His writings possess considerable value, but they are not read extensively.

ROHLFS (rölfs), Anna Katherine Green, novelist, born in Brooklyn, N. Y., Nov. 11, 1846. She graduated at Ripley Fen de College, Poultney, Vt., and soon became poular as a writer of novels. In 1884 she marrie 'Charles Rohlfs, but is more extensively known by her maiden name. Her first production to attract wide attention is "The Leavenworth Case," in which she gives evidence of much knowledge concerning the work of detectives and criminal law. It has been dramatized and presented to large audiences. Other writings include "The Lost Man's Lane," "The Millionaire Baby," "The Mill Mystery," "That Affair Next Door," "The Sword of Damocles," and "The Filigree Ball."

ROHLFS, Friedrich Gerhard, German traveler, born in Vegesack, Germany, April 14, 1831; died June 3, 1896. After graduating from a medical institution of Berlin, he engaged with the French army in Algeria as surgeon, and in 1860 entered upon an expedition of discovery in Morocco. He made extensive tours through North Africa from 1863 to 1865, and two years later joined the English expedition against Abyssinia. He traveled in Cyrenaica in 1868, and with the support of the Khedive of Egypt made an expedition into the Libyan Desert in 1873. From 1875 to 1876 he traveled in North America, visited the African Kufra oasis in 1878, and made a tour of Abyssinia in 1880. He was German consul general at Zanzibar in 1885, but returned to Germany the following year and took up his residence in Weimar. His writings include "From Tripoli to Alexandria," "Diagonally Through Morocco," Across Africa," "My Mission to Abyssinia," "Discoveries and Explorations in Africa," and "Land and People of Africa."

ROJESTVENSKY, Sinovi Petrovich, naval commander, born in 1848; died July 19, 1908. He entered the naval service at an early age, was rapidly promoted, and distinguished himself in the Russo-Turkish War. During the war between China and Japan, in 1894, he witnessed a number of the leading engagements. He was promoted to be rear admiral in 1902 and two years later became commander of the Baltic fleet. During the war between Russia and Japan he commanded the same fleet and on May, 27, 1905, was encountered in the sea of Japan by the Japanese fleet under Admiral Togo, who defeated him. In this engagement his flagship and seventeen other vessels of the Russian fleet were sunk. Subsequent to the war he was made vice admiral. His death occurred at German Spa, on the Baltic, from the effect of heart trouble.

ROLAND (ro'land), or Orlando, the celebrated knight of the court of Charlemagne, who is famous as a hero of romance. Tradition places him in the relation of nephew to Charlemagne and his character is portrayed as that of a loyal warrior, both skillful and brave. Little is known of him and writers have gone so far as to assert that it is altogether uncertain whether Roland represents a real or an imaginary person. We learn both from German and Frankish literature that Charlemagne was at Paderborn in 778, where he was busied in establishing civil government among the Saxons and attending to their admission into the Christian church. He was visited while there by a Saracen chief, who proposed to deliver a region south of the Pyrenees to the Franks, which proposition was at once accepted by the great commander.

Agreeable to the understanding, Charlemagne marched at the head of a large army into Gascony, where he compelled Duke Loup to do him homage, and annexed Pampelona and Saragossa. After finding that the Saracen ally could render but little assistance, Charlemagne decided to return to France, and while slowly threading through the valley of Roncesvalles the rear guard was attacked by a large body of Gascons. Roland immediately rushed to the defense, but in a most gallant fight was slain while leading his troops. This incident was the occasion of the celebrated "Song of Roland," which has remained an interesting piece of literature. It was sung at the head of the Frankish troops for centuries. A notable instance is the conquest of England by William of Normandy, when it was sung by the marching columns to keep them in good cheer. Visitors in the Pyrenees are still shown the place that was the scene of the exploits of Roland, and his story is one that still passes current among the hardy mountaineers.

ROLAND, Marie Jeanne, eminent lady of France, born in Paris, March 17, 1754; guillotined Nov. 9, 1793. She was the daughter of Pierre Gratien Philipon, an engraver, who lost his money by speculation, while her mother died at an early age. She was endowed by nature with great beauty and intellectual strength, and from childhood possessed a remarkable interest in study and reading. In 1780 she married Jean Marie Roland (1734-1793), a French minister of the revolutionary period, who is celebrated as the leader of the Girondists. Her husband became minister of the interior in 1792, but was compelled to flee from the turbulent scenes occurring in Paris the following year, finding safety at Rouen.

Madame Roland had been a conspicuous and influential figure among many of the leading statesmen, such as Buzot, Gironde, Brissot, and Petion. In the earlier period of the revolution she was on terms of friendship with Danton and Robespierre. It is not hard to understand how suspicion would attach to her as an influential factor in forming the policy of the Girondists,

especially since her husband had fled from the scene of excitement, and she was accordingly placed under arrest on May 31, 1793. Though an avowed advocate of the establishment of a republic, she was released in June, but shortly after was rearrested and in November was brought to the guillotine. Her last words were "O Liberty, what crimes are committed in thy name!" Her husband became entirely prostrate on hearing of the execution and committed suicide on Nov. 15, 1793.

ROLFE (rŏlf), John, colonist, born in Norfolk, England, in 1585; died in 1622. He left England with a company of colonists in 1609, but was detained several months in the Bermuda Islands and reached Virginia in 1610. Some writers contend that he introduced the cultivation of tobacco in America. In 1608 he married an English lady, who died in 1610, and three years later he married Pocahontas, the daughter of Powhatan. He and his wife made a trip to England in 1616, where Pocahontas died the next year He returned to America soon after and became prominent in the early government of Virginia.

ROLFE, William James, editor and author, born in Newburyport, Mass., Dec. 10, 1827. He was educated at Amherst College, but left before graduating and engaged as school-teacher in Cambridge, Mass. In 1869 he became editor of the Popular Science News, but devoted much time to writing school text-books and editing poetical works. Harvard University granted him the degree of master of arts in 1859. The same degree was granted to him by Amherst in 1865 and the degree of doctor of literature in 1887. Rolfe traveled extensively in Europe. In 1892 he visited Tennyson at Aldworth and in the same year published an account of the visit in The Critic. Among his writings is "Cambridge Course of Physics," in six volumes. He edited Craik's "The English of Shakespeare" and Lamb's "Tales from Shakespeare." He died July 7, 1910.

ROLLING MILL, an establishment in which metal is made into desired forms by being worked between pairs of rollers. The crude iron ore taken from the mine by blasting is transferred to the rolling mill, where it is puddled and rolled. Puddling involves heating by means of a furnace, whereby such impurities as sulphur, carbon, silicon, and others are separated from the iron. The separation takes place while the ore is in a melted condition, the iron forming into granules as the mass is stirred by the puddlers with an iron rod or by machinery. When a bulk of molten iron has collected by the union of granules, it is taken to the hammer, where it is formed into balls. Thus heated and balled, it is made into bars or sheets by the rolling mill.

This machine consists of one or more pairs of iron rollers, so adjusted that they may be set nearly in contact by means of set screws. The rollers are supplied with grooves so made that the desired form is given to the heated iron as it passes between them. It is gradually decreased in size and increased in length in the process of passing through the rollers, by reason of each roller having a series of grooves gradually decreasing in size toward one end. The process differs somewhat according to the product desired. Generally the ore is passed through the mill two different times. The first time it is worked to remove the impurities remaining after puddling, after which the iron is reheated and passed through the mill a second time to form it into bars, sheets, rails, hoops, or any form desired.

ROMAN CATHOLIC CHURCH, the denomination of Christians that recognizes the Pope or Bishop of Rome as its visible head, which assumes to be the only catholic and apostolic church. The word catholic, meaning universal, was used by early Christians and continued to be the common designation of the vast number of Christians throughout the Middle Ages. Protestants refused to admit that the church which they left is entitled to call itself Catholic in the sense in which the term is used. From the beginning of the Reformation they prefixed the adjective Roman, while the Catholics claim the designation Catholic without a qualifying adjective. Theoretically the Roman Catholic Church claims spiritual authority on earth. This claim is based on the belief that Christ conferred upon Peter a primacy of jurisdiction, that Peter fixed his see at Rome, and that the bishops of Rome have succeeded him in his prerogatives of supremacy. This view is strengthened by Catholic historians in that they refer to Rome as a center at which appeals from other churches on matters of doctrine and discipline were decided, bishops were nominated, and heresies were condemned. However, Protestant historians question whether Peter fixed his see at Rome. They regard the superiority of Rome as a center largely the result of its political and social power.

The teachings of the Roman Catholic Church are based on the Scriptures and tradition. They are set forth distinctly in the Apostles' Creed, the Nicene Creed, and the Athanasian Creed. To these Pope Pius IV., in 1564, added the articles on the invocation of saints, on entire transubstantiation of the eucharistic elements in the body and blood of Christ, and others that distinguish it largely from the Protestant creeds and those of other Christian sects. Seven sacraments are recognized, those of baptism, confirmation, the eucharist, penance, holy orders, matrimony, and extreme unction. In 1854 the dogma of the immaculate conception of the Virgin Mary was added and in 1870, that of papal infallibility.

Roman Catholics believe in the existence of a purgatory and the necessity of confession, and make a clear distinction between doctrine and discipline. *Doctrine* is held to be embodied in

the teachings of Christ and his disciples. On the other hand, discipline includes the rules laid down for the government of the church by the councils, the religious observances and practices, the administration of sacraments, and confessions and fasting. The membership of the church consists of all persons who, having been baptized, hold to its doctrines and recognized jurisdiction.

The Pope is chosen for life by the College of Cardinals. He is the center of unity and the supreme head, and without his consent no bishop can be consecrated. Cardinals at the head of congregations direct the administration of the church, and these answer to ministers established in Rome by papal authority. In the Western churches the clergy are bound by a vow of celibacy, but in the Armenian and Greek branches orders are granted to persons married, but marriage after ordination is forbidden. Celibacy is practiced by all the monks and nuns.

A vast monastic system is maintained, which comprises orders known as seculars and religious. Each has its own superiors and is responsible directly to the Pope or to the bishops. Among these orders are the Franciscans, Augustinians, Carmelites, Capuchins, Dominicans, Carthusians, and Jesuits. The missionary work of the Catholic Church takes high rank in all countries of the world, through which means it has promoted a high standard of morality. Latin is used almost exclusively in all recognized rites in America, Europe, and the missionary jurisdictions, but various other languages are employed in the East, as Coptic, Greek, Armenian, and Syro-Chaldaean.

The total membership of the Roman Catholic Church in the United States, in 1917, was given at 14,330,370. In the same year it had 15,704 churches, 20,962 priests, and 68 institutions of higher learning. These institutions were attended by 6,042 students. In addition to these it had 4,031 parish schools, with 884,680 pupils. In 1917 there were 2,005 Roman Catholic churches and 2,840,780 communicants in Canada. The total Roman Catholic population of the world is placed at 272,860,000. See Pope.

ROMANCE (ro-mans'), the name of a class of literature which originated among the people who employ the Romance languages, that is, the French, Italians, and Spaniards. It is distinguished by comprising a class of literature of fiction, either prose or verse, in which the marvelous or uncommon incidents are prominent. As a branch of literature it belongs essentially to the Middle Ages and first attained prominence during the four centuries of knighthood, but became especially popular in the 15th and 16th centuries. While many of the Greek writings represented men and incidents as they were believed to be, the *Odyssey* is a series of marvelous tales of an essentially romantic character. This and other writings were followed more or less in the verse romance of the Middle Ages, and

from its original seat in Southern Europe it finally extended to the western and northern countries.

Geoffrey of Monmouth published his Latin work entitled "Historia," which was revived and republished in its present form in 1147. Soon after it was translated into French and versified. The romances of Arthur published in this work induced literary interest on the continent as well as in England, where Arthur became a national hero of romance and a leading figure around whom might be grouped the adventures of subordinate knights. French writers treated Charlemagne in much the same manner, but he had the advantage of being a more distinct historical character than Arthur. Other heroes of romance include Alexander, Guy of Warwick, Roland, and Havelok de Dane. In the German Nibelungenlied, the Anglo-Saxon Beowulf, and the Spanish Amadis de Gaula we have other examples of heroes who figured in romance. Among the latter English productions that belong to this class of literature may be mentioned the historical romances of Sir Walter Scott and a host of writers who succeeded him, such as Robert Louis Stevenson and Alfred Tennyson. Besides furnishing a distinct class of literature of fiction, romance has exercised a more or less wide influence upon the development of the novel.

ROMANCE LANGUAGE, the name applied to the spoken language in the southern part of Europe from the 10th to the 14th century. It was composed of a corrupt form of the Latin. While some writers treat the languages that grew out of the corruption of the Latin as a distinct tongue, it is generally conceded that there was no uniform general language of this character, but the dialects spoken were of great Provençal is the most important similarity. branch of this period, but it is followed closely by the Wallachia and Romansh.

The term Romance languages is generally applied by recent writers to the spoken and written tongues that had their origin in the Latin, or which owe their development to the extension of the dominion and civilization of the Romans. At present not less than seven of these languages are used more or less extensively. These include the Italian, Spanish, Portuguese, Provençal, French, Ladino, and Rumanian. Italian is harmonious in form and is distinguished by the rich fullness of its tones. Spanish is peculiar for its short, distinct sounds, fixed tones, and the adoption of Arabic words. Portuguese is the western dialect of the Spanish and has almost the same words, but the pronunciation is in the style of the French. Grace and delicacy characterize the French, which is the most historical of the Roman languages, and Provençal is closely related to it. Ladino is spoken along the Adriatic, is also called Romansh, and lacks uniformity in orthography and pronunciation. Rumanian is the language of Rumania, but is thought to have come from the northern part of Italy rather than from the Roman colonists of Dacia. All of these languages have elements in common with Latin, hence the study of the latter is helpful in the mastery of the others.

ROMANS, Epistle to the, a book of the New Testament, written by Saint Paul to the church of Rome. It was probably written at Corinth, where Saint Paul remained about three months, and is assigned by commentators to the year 58 or 59 A. D. The epistle consists of two principal parts, one of which is argumentative and the other is hortatory. It contains a complete statement of the doctrine held by the writer, including justification by faith as a means of salvation to all men, Gentiles as well as Jews. He deplores the fact that many Jews rejected Christ, and admonishes the Romans to embrace the spirit of humility, which will enable the strong to bear with the weak. The book is concluded with various salutations and directions. The authenticity of the epistle has been conceded

by practically all writers.

ROMANTICISM (rō-măn'tĭ-sĭz'm), the name applied to the productions of a school of writers who sought to revive certain forms and methods in opposition to the classical style. The latter had its origin in the literature of Greece and Rome, while romanticism relates more especially to the writings that belong to the nations of Western Europe. In Germany the name romantic was introduced to designate the poetry which resulted from chivalry and Christianity. In general the terms classic and romantic have reference to treatment, not to subject, and the difference is that in the classic the treatment is with the view of representing the idea as directly and with as exact an adaption of form as possible, while the romantic leaves the reader to discover the idea from suggestions and symbols. The classic form is adversely criticized in that it does not appeal to the imaginative faculty.

Lessing and Herder are among the leading opponents to the classic ideas in German literature. The movement had a supporter in Goethe, whose "Sorrows of Werter" is a fine example of the romantic style. Other German writers of this class include Novalis, Tieck, Schlegel, Schelling, and Schleiermacher. Victor Hugo is one of the leading romantic writers of France and his "Odes and Ballads" is his finest example. The English writers of this school are very numerous and are represented by Thomson, Keats, Scott, Byron, Burns, Coleridge, Pope, and Wordsworth. At least two essentials characterize romanticism, the first is a love of the picturesque and the other is a spirit of unconscious reaction to the writings of the period that immediately preceded.

ROMAN WALLS, the remains of lines of defense constructed by the Romans in various parts of Europe. The most noted of these structures is on the frontier between the Rhine and

the Danube, known by the Romans as the Limes. It extended from Hienheim on the Danube, near Ratisbon, Germany, almost due west to Stuttgart. Another wall of this kind extended from Rheinbrohl, on the Rhine, in a direction toward the southeast, to the border of Rhaetia. These structures were mostly of stone, but in some places they were in the form of earthworks protected by ditches. A similar wall was erected to protect the northern boundary of Britain. Another wall was built of turf from the Solaway to Newcastle-on-the-Tyne. It was about eighty miles long and was completed in the year 120 A. D. by Hadrian. Septimius Severus, about 90 years later, replaced the turf structure with a stone wall, and this may be traced at the present time. It was built as a means of defense against the Picts and Scots.

ROME, a city in Georgia, county seat of Floyd County, on the Coosa River, which is formed here by the junction of the Etowah and the Oostanaula rivers, sixty miles south of Chattanooga, Tenn. It is on the Southern, the Central of Georgia, the Nashville, Chattanooga and Saint Louis and other railroads. The surrounding country is fertile, producing cotton, fruit, and cereals. This is the seat of Shorter College for Women, a Baptist institution. Other features include the county courthouse, the Federal building, the public library, the Hearn Institute, the Everett Springs Seminary, and Mobley Park. It has systems of waterworks and sanitary sewerage, brick and macadam pavements, and electric street railways. Among the manufactures are cotton goods, furniture, leather, farming implements, and machinery. It was chartered as a city in 1847. At the time of the Civil War it was captured by a Federal

force. Population, 1900, 7,291; in 1910, 12,099. ROME, a city of New York, in Oneida County, on the Mohawk River and the Erie Canal, fifteen miles northwest of Utica. It is on the New York Central, the New York, Ontario and Western, and other railroads. The surrounding country produces large quantities of grain, cheese, butter, hops, and fruit. The chief buildings include the Jervis Library, the high school, the Saint Peter's Academy, the Y. M. C. A. building, the State Custodian Asylum, and many fine churches. It has well graded and paved streets, electric street railways, and systems of public waterworks and sanitary sewerage. Among the manufactures are engines, furniture, ironware, machinery, saddlery, glue, cigars, and wire. Rome occupies the site of Fort Stanwick and near it the battle of Oriskany was fought. The place was incorporated as a town in 1796 and was chartered as a city in 1870. Population, 1905, 16,567; in 1910, 20,497.

ROME, a city of Europe, the capital of Italy, formerly the capital of the Roman kingdom, republic, and empire. It is situated on the Tiber River, about fifteen miles from the sea, being partly on a plain and partly on the slopes of the

famous Seven Hills. Formerly it was unhealthful, being in the Campagna, but now it is one of the most sanitary cities of Europe. The range of temperature is from 23° to 99° and the climate is less severe than that of Florence.

Ancient Rome. The early history contains much of interest, since it was not only one of the most important cities of the ancients, but has long been noted as a religious center of western Christendom. According to tradition, the city was founded by Romulus and Remus, two sons of Rhea Silvia, a priestess of the goddess Vesta, and of Mars, the god of war. These two children were ordered thrown into the Tiber by a usurper, but were cast ashore at the foot of Mount Palatine, where they were nursed by a wolf, but afterward they were rescued and brought up as the children of one Faustulus. The city was named after Romulus, who became its first king.

The founding of ancient Rome is generally placed at 754 B. c. and the founders are regarded as Latins, who left Alba Longa in a colony to establish an outpost against the Etruscans. No reliable account of the early history of Rome is in existence, as the records were burned when the city was destroyed by the Gauls in 390 B. c. The early inhabitants were shepherds or farmers, who tilled the land upon the plain near by, but lived for protection within their fortifications on Palatine Hill. At the time the Gauls destroyed the city, they left most of the buildings in ruin, and it was hastily rebuilt without planning for regularity in its streets. The leading thoroughfares remained narrow and crooked in many parts of Rome until Augustus Caesar became emperor, in 31 B. C. He beautified the city by adorning it with monuments and works of art so that it was said of

him, "He found the city of brick, and left it of marble." However, the groundwork for a great

city was laid long before his time. The low places between the hills were improved by

grading in the early history of the city, when

also a huge system of drainage was constructed. The great aqueducts were begun by Appius

Claudius Caecus in 312 B. c., by which water was

brought to the city from springs seven miles

distant, and material additions were made until fourteen aqueducts were completed. These had

a length of 300 miles. They still form a very

interesting feature of modern Rome. The Campus Martius was originally a marshy tract lying between Capitoline Hill and the Tiber. It was so named because of its use for military exercises. In this stood the theater of Pompey, an immense structure with a seating capacity for 40,000 persons. On Capitoline Hill was the splendid temple of Jupiter Capitolinus, called the Capitol. Near it was the theater of Marcellus, finished by Augustus in 11 B. C., and also the Colosseum, an immense oval building used for gladiatorial exhibitions, in which many Christian martyrs suffered death. It was about

600 feet long by 500 feet wide, and had a height of 160 feet. Its capacity was ample for 87,000 spectators. The largest structure was known as the Circus Maximus, situated between the Palatine Hill and the Aventine Hill, and had a seating capacity for 250,000 persons. The Circus Maximus has been long destroyed, but the ruins of the Colosseum are still to be seen.

Ancient Rome had numerous public baths, the largest being the Thermae of Titus, traces of which remain on Esquiline Hill. The famous Diocletian bath was the largest and most magnificent, and a portion of it is now used as a church. Its buildings included many large and substantially constructed palaces, temples, and private residences. The most noted temples were the Temple of Venus, built by Caesar; the Temple of Peace, a magnificent structure built by Vespasian; and the Temple of the Sun, erected by Aurelian. Near the Forum are the triumphal arches of Severus, Titus, and Constantine, while that of Drusus is in the Appian Way. beautiful Trajan pillar in the Forum is still standing. Remains of catacombs, subterranean galleries used as burial and meeting places, and remnants of street pavements, may still be seen in many parts of the city. The Tiber was spanned by a dozen substantial bridges, eight or nine of which are intact. It is estimated that the population of Rome in time of Augustus was 1,300,000, but in the time of Trajan it is said to have reached about 2,000,000.

Modern Rome. At present Rome extends to both sides of the Tiber, as did the ancient city. However, it is difficult to determine whether the limits coincide with those of Ancient Rome, when they probably extended some distance beyond the present boundary, especially in some directions. It has substantial walls, those on the east bank of the Tiber dating from the time of Aurelian, in the 3d century. The city has been improved remarkably since it became the capital of United Italy, its streets having been not only extended and straightened, but material improvements having been added in the way of sewerage, paving, electric lighting, and rapid transit. Embankments have been constructed along the Tiber to prevent overflows, thus guarding against damages and disease common to the city in former times. Through the medium of vast excavations it has been possible to restore many historic structures and monuments, notably the Forum Romanus, the Temple of Castor and Pollux, and the famous Sacred Way, which was the great central street of the ancient city. Many alterations and improvements have been made in the piazzas, parks, and boulevards, while monuments of modern structure have been dedicated to representative statesmen of modern Italy.

BUILDINGS. The most notable building in Rome is the Church of Saint Peter, which is considered the finest structure of the kind in the world. It is decorated by monuments and paint-

ings by the great masters. Besides this place of worship, the city has about 325 churches. Many of these are memorial churches and are opened only on the day of the year assigned to the saint to whom they are dedicated. The Vatican adjoins Saint Peter's and is the palace of the popes. It contains the Vatican library, a picture gallery, and splendid museums. The palace on the Quirinal, formerly a summer residence of the popes, has been occupied by the King of Italy since 1870, but the Palazzo della Cancelleria is still occupied by those in connection with the Roman Catholic Church. Rome is noted for many great educational institutions, the most important being the university founded by Pope Boniface VIII., in 1303. It has departments of physics, zoölogy, mineralogy, botany, astronomy, anatomy, law, medicine, and theology. Among the equipments are included a fine collection of apparatus, botanic gardens, and an astronomical observatory. It is attended by about 2,350 students. Rome has a system of common schools, which is maintained by public grants and taxation, but the instruction is chiefly in parochial schools and monastic institutions. The city is the seat of charitable institutions, numerous hospitals, academies, and many large libraries.

LATER HISTORY. Rome was identified with the rule of the popes from the downfall of the Roman Empire, in 476 A. D., until the rise of United Italy, in 1871. An army under the constable of Bourbon captured and sacked the city in 1527, and Napoleon occupied it in 1798. He made Pope Pius VI. a prisoner and carried him to France, and soon after a Roman republic was established. A republican army under Garibaldi and Mazzini expelled Pope Pius IX. from Rome in 1848, but he was restored to power by a French army sent the following year to consummate the overthrow of the new republic. With the fall of the French Empire in 1871, new life was enkindled for the union of the Italian states. In July of the same year the city became the capital of United Italy, when the king, Victor Emmanuel, took up his residence in the Quirinal. Population, 1916, 590,960.

INDUSTRIES. As compared with other cities of the same size, Rome is not important as a center of commerce and industries. It is the converging center of several railroads, but has only a very limited trade by navigation, since the Tiber is navigable only for small vessels. Grain, wine, and cattle are imported. Most of the export trade is carried on by way of Fiumicino, its seaport on the Mediterranean, with which it is connected by railway. Among the manufactures are silk and woolen goods, earthenware, toys, jewelry, musical instruments, leather, flour, soap, macaroni, and artificial flowers. Large quantities of art products are made, such as cameos, mosaics, bronzes, and church ornaments. Rome is a gathering place for tourists and travelers, who come here to view its historical treasures. It is the Mecca that attracts students to study its paintings and sculptures.

ROME, an ancient nation of Southern Europe, one of the most powerful and historic of antiquity. The history extends from the founding of the city of Rome, in 754 B. C., to its downfall, in 476 A. D., over twelve centuries. This long expanse of time may be divided into three periods, according to the form of its government. They include the kingdom from 754 to 509 B. C., the republic from 509 to 31 B. C., and the empire from 31 B. c. to 476 A. D. It is thought that the Latins who founded Rome came as a colony from Alba Longa, and that the latter city was founded by Ascanius, a descendent from fugitive Trojans.

EARLY HISTORY. Many accounts have been published in regard to the founding of Rome, but the one most generally accepted is that the destruction of Troy by the Grecians caused many fugitive Trojans to flee to Italy, where they were received kindly by King Latinus. Rhea Silvia, daughter of a deposed King of Italy, was the mother of Romulus and Remus, two children who were designed to be killed by the reigning king, but they were discovered and reared by a shepherd. Romulus became the founder of Rome, in 754 B. c., and was the first of the kings. He encouraged settlements by constructing fortifications to protect the citizens against hostile tribes, building them in such a manner that the people could reside within the fortifications while they tilled the soil and reared their herds in the adjoining region. It is probably true that the early settlements were greatly enlarged by Aryans coming from Asia by way of Greece, and that the cities of Latinum formed a confederacy with Alba Longa at its head. The settlements grew rapidly, expansion being due largely to the fertility of the soil and natural advantages in the way of river and sea navigation.

KINGDOM OF ROME. The early government of Rome was aristocratic, being administered under a priest-king, who was assisted by a senate and an assembly. However, the city was frequently attacked by the Sabines, a tribe occupying the upper valley of the Tiber, and afterwards they captured the Quirinal and Capitoline After many years of conflict the two hills. tribes became united and formed the two parties known as the Romans and the Quirites, both having seats in the senate, while the king was taken alternately from each. Later the city was conquered by the Etruscans, who placed the Tarquins on the throne and ornamented the city with elegant structures in the Etruscan style of architecture. They extended the city to include the Seven Hills, inclosing the whole with a wall that endured eight centuries. It was due to the Etruscans that Rome became the head of the thirty Latin cities within 150 years after it was founded.

As the adjoining cities of Italy were con-

quered, many people of foreign birth were brought or removed into the city. This element gave rise to the plebeians, while the Latins, Sabines, and Etruscans constituted the class known as the patricians. However, the Tarquins were the friends of the plebeians. The nobles, becoming dissatisfied with the advance of the plebeian power and the corresponding restriction of the kings, joined other Latin cities to expel their Etruscan rulers, which they did in 509 B. C. The following is the chronology of the Roman kingdom, as generally given by historians: Romulus, 754-716; Numa Pompilius, 716-672; Tullus Hostilius, 672-640; Ancus Martius, 640-616; Tarquinius Priscus, 616-578; Servius Tullius, 578-534; and Tarquinius Supurbus, 534-509.

REPUBLIC OF ROME. With the establishment of the republic, in 509 B. C., two chief magistrates were chosen. These were at first called praetors, but the name was later changed to consuls, and a constitution modeled by Servius was adopted. Conflicts continued between the Romans and the Etruscans until 295 B. C., when the latter were not only subdued, but Rome became the master of all Italy. However, contests of a political character were constant between the patricians and the plebeians. The former were descendants from the first settlers, and were rich, proud, and exclusive, making a demand of all the offices and emoluments of the government. On the other hand, the plebeians were the common people. They were denied the rights of citizens and were not allowed to intermarry with the patricians. Besides, they were obliged to serve in the army without pay and their want of means to carry on industrial enterprises at home rendered them creditors to the patricians, who reduced them to a form of slavery and sold them as slaves when they became unable to pay their debts.

The plebeians urged their demand for equal privileges with the patricians for the first 200 years of the republic and gradually their demands were complied with, a consummation hastened by the fact that they formed the principal part of the army. In 445 the law against intermarriages was abolished. Soon after the plebeians were granted three military tribunes with consular powers and in 367 B. c. their victory was finally won, when they succeeded in rapid succession in securing the dictatorship, the censorship, the praetorship, and the right to

be pontiff and augur.

The period of contest between the patricians and plebeians was disturbed more or less by foreign wars and internal strife among the different tribes. Rome was captured and nearly destroyed by the Gauls in 390 B. c., and the invaders agreed to recross the Apennines only on condition that they receive a heavy ransom. This invasion was in some respects beneficial to the Romans, since they were deeply impressed by the courage and strength of the Gauls, and

at once began to rebuild their city. The next war took place in 280-276 B. C., against Pyrrhus, a Grecian colony in southern Italy, which resulted in the subjugation of the latter. Thus triumphant at home, Rome entered upon the First Punic War, in 264, and continued this contest against Carthage until 241 B. c. The Second Punic War occurred in the period from 218 to 201 and the Third from 149 until 146 B. c. These wars with the Carthaginians and their attendant contests covered a period of about 100 years. Carthage, a city of Africa that had flourished over 700 years and numbered 700,000 inhabitants, was utterly destroyed and the Carthaginian territory became the Roman province of Africa. While Hannibal was commanding the Carthagians he made a treaty with Philip, King of Macedon, and out of this grew three wars against the Macedonians, which culminated in the Battle of Pydna in 168 B. C. The results of these wars were reaped within a brief period and included the downfall of Greece. In 146 B. C. Macedon became a Roman province, Corinth fell the same year that Carthage was captured, and all of Greece was made the Roman province of Achaea. Thus victorious in Carthage and Greece, the Romans began to look toward the East for conquest. They had already defeated the Syrians at Thermopylae in 190 B. c. and had overthrown their power on the field of Magnesia, in Asia Minor.

The Roman nation extended its influence by the year 133 B. c. so as to include the vast region from the Atlantic to the Bosporus, besides a part of Northern Africa and much of Western Asia. Its soldiers had come in contact with both civilized and savage opponents, while many parts of Italy had been swept with fire and the sword by Hannibal. Both of these circumstances had brought about material changes in economic conditions, since there was need for restoring rural prosperity, and the capital city needed a more rigid government. Conditions hastened on the civil wars, and Rome in rapid succession passed through conflicts that operated to destroy the republic. The first material internal disturbance arose over the measure introduced by Tiberius Gracchus in 123 B. C. This tribune sought to have the public land assigned in small farms to the natives with the view of giving every man a homestead, and proposed in addition that those receiving land should be allowed means from the public treasury to build houses and buy cattle. This measure was supported by all the friends of the common people, but it was opposed with great vigor by the nobles, and resulted in the assassination of Gracchus and his leading supporters by agents of the aristocracy. Soon after Jugurtha usurped the throne of Numidia, which occasioned the war against him in 118 B. C., known as the Jugurthine War.

The invasion of Rome by the Teutons and Cimbri began in 113 B. C. These were followed

by the Social War, due to the question of admitting Italians to citizenship, in 90 B. C.; the first Mithridatic War, in 88 B. C.; the Gladiatorial War, in 73 B. C.; and the great Mithridatic War, in 74 B. C. In the meantime occurred several wars resulting from disagreements among the generals and statesmen. The leading men of Rome at that period were Caesar, Crassus, Cicero, Octavianus, Pompey, and Cato the Stoic. The first triumvirate was concluded by Pompey, Crassus, and Caesar in 60 B. C., forming a compact so strong that they were able to manage the affairs of the republic at their pleasure, and it was cemented by Pompey marrying Julia, only daughter of Caesar. Soon after followed the banishment of Cicero and the appointment of Cato to Cyprus, while Caesar became consul and was afterward appointed as governor of Gaul. A civil war between Caesar and Pompey began in 49 B. C., and, though Pompey had boasted that he could raise an army by stamping his foot upon the ground, he was obliged to flee from Rome without striking a blow. A battle between the two rivals occurred on the plain of Pharsalia, Greece, in 48 B. c., which resulted in the defeat of Pompey and he was obliged to flee to Egypt, where he was assassinated. Cleopatra was elevated to the throne of the Ptolemies by Caesar and the Syrians were so completely defeated that Caesar sent his celebrated dispatch: "I came, I saw, I conquered." Victorious in the East, Caesar hastened to celebrated 'a four-days' triumph in Rome, where he was created dictator for ten years and censor for three. In the meantime he attained other victories and established peace in Spain.

The government of Caesar was administered honestly. During his administration canals and highways were built, the poor were given employment, Rome was enlarged and beautified, and his vast dominion from the Euphrates to the Rhine was guarded with remarkable vigor. The senate created him dictator for life, but differences and jealousies arose that finally terminated in his assassination in 44 B. c. Caesar's death was followed by the second triumvirate, which was concluded by Antony, Octavianus, and Lepidus. By its terms Brutus, Cicero, and Cassius were proscribed. Cicero was shortly after beheaded and Brutus and Cassius met their opponents in the Battle of Philippi in 42 B. C., but their complete defeat caused them to commit suicide in despair. Rome was divided beween Octavianus and Antony, the former receiving the West and the latter the East. A civil war between the two great leaders terminated in the naval Battle of Actium, in which Antony and Cleopatra were defeated and fled to Egypt. With the Battle of Actium ended the civil wars and the Roman republic. Octavianus, now master of the civilized world, became Emperor of Rome in 31 B. C., and assumed the title of Augustus.

EMPIRE OF ROME. Although an empire had been established, Augustus made no radical changes, but kept all the forms of the republic. This course was necessary, since a radical assumption of power would have resulted in his deposition. However, he really exercised absolute sway and all the offices of trust were centered in him, including those of pro-consul, consul, censor, tribune, and high priest. The empire at that time contained 120,000,000 inhabitants. It extended from the Euphrates on the east to the Atlantic on the west, and from the deserts of Africa on the south to the Danube and Rhine on the north. Fully 100 different nations were included in this vast dominion, each speaking its own language and worshiping its own gods.

The Age of Augustus was one of general peace and prosperity. It was not only the design of the emperor to maintain schools, extend literature, and effect internal improvements, but also to Romanize his subjects. This had already been accomplished in Gaul and was under way in Germany, but Arminius, a brave leader of the Germans, aroused his countrymen in opposition. In the year 9 A. D., Varus and his entire army in Germany met destruction, and Roman authority never was fully reëstablished in the country of the Teutons. The most important historical event of his reign was the crucifixion of Christ at Jerusalem, under Pilate, then Roman procurator of Judaea. On the death of Augustus, in 14 A. D., Tiberius, his stepson, became emperor by a decree of the senate. The emperors succeeding Tiberius were Caligula, in 37; Nero, in 54; Vespasian, in 69; and Domitian, in 81. Domitian was succeeded by the five good emperors, Nerva, Trajan, Hadrian, Antonius Pius, and Aurelius, who reigned from 96 until 180 and gave Rome both peace and prosperity. Aurelius is regarded one of the most virtuous and wisest of earthly rulers, but the later years of his reign were disturbed by invasions of the Germans and the Slavs of Russia. He was succeeded by his son, Commodus, in 180, and from that time Rome began to decline.

The decline of Roman power is due to many causes. It may be said that the most prolific were the rise of factional militarism, the continuous invasions by the Goths, Germans, and Persians, the concentration of wealth into the hands of a few, and a low state of political and moral aptitude. During the 1st century Christianity spread rapidly over the Western Empire and became a potent force in displacing the gods of the Romans. Though tolerant of all religious beliefs in every nation they conquered, the Romans persecuted the Christians. This was due to the fact that they alone refused to offer sacrifice to the gods of the empire. They absented themselves from the games and feasts and were accustomed to hold their meetings at night. Soon they came to be regarded enemies of the state and were persecuted by even the best rulers, as Trajan and Diocletian. Besides, a marked change came about in Roman citizenship, since the emperors were of provincial birth and the army consisted chiefly of Germans and Gauls.

Constantine was declared emperor by his troops in 306 and, after overthrowing five rival contestants for the throne, he became sole ruler in 324. His reign marked an era in the history of the world, for the reason that he established Christianity as the state religion and removed the capital from Rome to Byzantium, a Greek city on the Bosporus, which was renamed Constantinople in his honor. He made the government absolutely despotic by establishing a court of titled nobility and weakened the power of the army. While Christianity made it possible for the empire to resist three centuries of barbaric invasions, it did not supply enduring strength. Julian the Apostate sought in vain to restore the old religion and Valens taxed every energy of the empire to repel the invading Goths, who pressed forward to the very gates of Constantinople, but he was captured and burned.

Theodosius the Great for a few years stayed the division of the empire by enlisting 40,000 Goths under the eagles of Rome, but at his death, in 395, a division occurred between his two sons. The Eastern, or Byzantine Empire, passed to his son Arcadius and the Western Empire, to Honorius. Continuous jealousies between the two empires greatly weakened both governments and, to save his dominion from ruin, Arcadius induced the invaders from the north to turn against Italy. The three great barbaric leaders were Alaric the Goth, Attila the Hun, and Genseric the Vandal. Alaric captured Rome in 410, while Attila swept like a scourge across Italy and only spared Rome from utter destruction, in 451, at the entreaties of Pope Leo. Genseric secured control of the Mediterranean and sailed up the Tiber in 455. Pope Leo met Genseric to entreat that the city might be spared, but he turned it over to the warriors to be sacked. He carried 30,000 slaves and vast treasures from Rome to Carthage, where he had founded an empire on the site of the city destroyed by the Romans six centuries before. Rome was now at the mercy of Odoacer, a German chief, who commanded that Romulus Augustulus, the last Roman monarch, lay down his useless scepter. The emperor yielded in 476, and thus passed away the great Roman Empire. It is a curious incident in history that both the founder and the last sovereign of Rome bore the name of Romulus. Byzantine continued a recognized nation for a thousand years after the fall of Rome, ending with the capture of Constantinople by Mohammed II., in 1453. Rome was a province of the Byzantine Empire until 800, when Charlemagne received its crown, though its history had become merged into that of Italy some centuries before. See Italy, subhead HISTORY.

LANGUAGE. Politically there was a clear distinction between Rome and Latinum, but the language of the two sections was the same and it was called Latin. It belongs to the Aryan family of languages and was perhaps spoken in several dialects as early as 1500 B. c. It is probable that the Latin and Greek came originally from the same source, since there is a manifest connection between the two languages. Classical Latin was formed in the period when Rome was a republic and an empire, though during the last two centuries of its history many foreign words were injected through contact with other languages, and by the 8th century it ceased to be spoken as a distinct tongue. tongues developed from the Roman include the modern Romance languages, which are chiefly the Italian, Rumanian, Spanish, Portuguese, and French. The literature and language of the Latins were preserved in remnants of the great libraries, which were carried by the clergy to the convents in the Middle Ages, and were afterward brought to the great libraries of Europe, particularly those of Rome. Many of the leading writers of Europe, following the revival of learning, wrote largely in Latin, and both the language and its literature were subjects of profound interest in all the higher institutions of learning for many centuries. All the modern languages of European people contain a large proportion of Latin words, the Latin addition to English being made at the time of the Norman conquest. Latin is characterized by a peculiar accuracy in expressing thought. This element, in connection with its supplying the roots of many derivative words, causes it to still hold its place of prominence as a study in the secondary and higher institutions.

LITERATURE. Roman literature was limited

to a few writings for about five centuries after the founding of Rome. It may be said that the "Law of the Twelve Tables," prepared about 450 B. c. and hung up in the Forum, was the first prose composition of importance. The earliest writings were fashioned almost exclusively after Greek models and their lyric, heroic, and dramatic meters came from the Greeks. Rome had elementary schools as early as 450 B. C., where reading, arithmetic, writing, and music were taught. Many of the teachers were Greeks and the children of wealthy families were sent to Greece to complete their education, but excellent higher schools and colleges were later established in all the Roman cities. The first translation of Greek classics into Roman was made by a Grecian slave who came to Rome about 250 B. c. He also wrote and acted plays inspired by Greek writings. "The Origines" is a work written by Marcus Portius Cato in the 2d century. It consists principally of a history of the origin of Rome and several other cities of Italy. Ennius, a Roman of

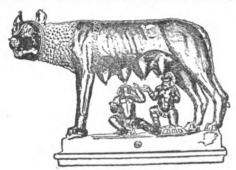
the same period, introduced a new style of literature, somewhat resembling the Grecian. His writings are largely poetical history and his "Annals," a poetical history of Rome, was for two centuries the national poem. He was honored by having his bust placed in the tomb of Scipio. The writings of Plautus belong to the early part of the 2d century, and are noted for their vigorous and brilliant wit. Terence, a learned and graceful humorist, who flourished about the middle of the 2d century, turned attention to greater refinement and more cultured forms of expression.

The Latin tragedies of the early Roman period were copied from the masterpieces of Sophocles and Euripides. Their comedies were translated from Aristophanes and other writers, their philosophy was borrowed from the Portico and the Academy, and their orators, even in the palmiest days, proposed to pattern after the speeches of Demosthenes and Lysias. To the 1st century B. c. belong the illustrious names of Varro, Cicero, Virgil, Horace, Livy, and Sallust. Varro founded large libraries and a museum of sculpture, cultivated the fine arts, and sought to awaken literary tastes among his countrymen. He wrote on history, theology, philosophy, and agriculture. Cicero is the most eloquent of all the Romans. He ranked high as an essayist, orator, and letter writer; his principal productions include his four orations on the "Conspiracy of Cataline." The Roman schools used his orations for lessons and many of his essays still are familiar Latin text-books. Virgil and Horace are known as poets of the Augustan age. Virgil's "Aeneid" is modeled after the Homeric poems and has been used as a textbook up to the present time, holding its place in the schoolroom. Livy write 42 volumes of Roman history, beginning with the fabulous landing of Aeneas, and closing with the death of Drusus in the year 8 B. C. Sallust is another historian of eminence, his most noted writings embracing the "Conspiracy of Cataline" and the "Jugurthine War."

The noted writers of the 1st century A. D. include Seneca, Juvenal, Tacitus, and the two Plinys. Seneca was a brilliant orator, poet, and Stoic philosopher. His writings are remarkable for their moral purity. They include "Ethical Essays," "Tragedies," and "Instructive Letters." Juvenal produced works remarkable for their satire and eloquence. Tacitus wrote in a grave and stately, though sometimes sarcastic, style. His writings include "History of Rome," "Life of Agricola," and a treatise on Germany. Pliny the Elder is the author of "Natural History, a work of 37 volumes, covering the whole range of scientific knowledge of his time. Pliny the Younger was a charming letter writer; his writings extant include the "Epistles" and the "Eulogium upon Trajan." Quintilian was the most eminent rhetorician and literary critic of Rome. He lectured for 25 years and afterward published his discourses in a work entitled "Institutes." His writings belong to the early part of the 2d century. Other writers of Rome include Emperor Marcus Aurelius, Saint Jerome, and Aurelius Augustine. Marcus Aurelius is remembered as a stoical writer, Saint Jerome as the translator of the Bible into Latin, and Aurelius Augustine as the author of the prophetic book called "The City of God" and of "Confessions."

ROMNEY (rŭn'nĭ), George, painter, born at Dalton, England, Dec. 26, 1734; died Nov. 5, 1802. He worked as an apprentice to a painter at Kendal and afterward settled at London. In 1762 he was awarded a prize by the Society of British Artists, after which he rose prominently in favor as a portrait painter. Critics place him as an artist next to Reynolds and Gainsborough. His portraits include those of Lady Hamilton, Joan of Arc, Lady Warwick, Emma Hart, and Richard Cumberland. Among his other paintings are "The Parson's Daughter" and "Bacchante"

ROMULUS (rŏm't-lus), brother of Remus, the traditional founder and first King of Rome. He was the son of Mars and Rhea Silvia, daugh-



WOLF STATUE AT ROME.

ter of Numitor, the Latin King of Alba. When Amulius usurped the Alban throne, he commanded the babes to be thrown into the Tiber, but they were cast ashore at the foot of Mount Palatine and suckled by a she wolf. A shepherd named Faustulus discovered them and with the assistance of his wife, Acca Laurentia, brought them up in his own home. After attaining manhood, they discovered their true rank and restored their grandfather, Numitor, to his throne. Afterward they resolved to found a city on the spot where their lives had been saved, but consulted the omens to see who should select the site. As the honor fell to Romulus, he was scorned by his brother Remus. Romulus then slew him and exclaimed, "So perish every one who may scorn the city." It was founded in 754 B. C., and called Rome after his own name, and he became its first king. He made his city the asylum of refugees. As there was a lack of women, young Romans seized maidens from the Sabines, which became known as the "Rape of the Sabines," and involved the new city in a war. The contest soon after ended through the entreaties of the Sabine wives and the two peoples became united. The death of Romulus, in 716 B. C., is accounted for in legends by the assertion that he disappeared in a thunderstorm.

ROOF, the covering of a building, designed to protect its interior from the weather, especially rain. The most important part of it is the framework, which in large buildings is very carefully and substantially constructed. The roof may be covered with a large variety of materials, such as tin, sheet iron, tiles, shingles, or slate. As used in carpentry, the roof consists of the framework by which the covering is supported. The principal timbers are the rafters, which set upon the plates, and are usually supported by purlins, which have a horizontal position and support the main or common rafters. The width between the supports is called the span, which is quite large in buildings of considerable size. The points at which the rafters meet indicate the height, called the rise, which is the distance above the level of the supports, while the slope, or angle, is called the pitch. In primitive carpentering the roof is common or plain. while the more ornamental styles are curved and hipped. Rafters are usually covered with sheathing made of lumber one inch thick. The shingles or other outside coverings are nailed to the sheathing.

ROOK, a species of crow. It differs from other birds of the crow family in having a naked spot at the base of the bill and in feeding on grain and insects instead of carrion. It is about twenty inches long and the alar extent is forty inches. The color is black with a purple gloss. Rooks are sociable and gather in large flocks. They mostly inhabit cultivated and wooded districts, and prefer to nest near buildings. Rooks are native to Europe and are common birds in the vicinity of the Mediterranean.



They are permanent in milder sections, but in the colder regions move southward on the approach of winter.

ROON (ron), Albrecht Theodor Emil von, statesman and soldier, born at Pleushagen, Ger-

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(Opp. Taft)

WILLIAM HOWARD TAFT.

many, April 30, 1803; died in Berlin, Feb. 23, 1879. He studied in the military academy at Berlin and entered the army in 1821, but served as a teacher of cadets from 1824 to 1827. His promotion to the different ranks was rapid, being made commander of a division in 1858, and the following year, minister of war. He commanded in the Schleswig-Holstein campaign of 1864 and in the Austro-Prussian War of 1866, receiving for his services the Black Eagle from King William. Soon after the close of the war he was detailed to reorganize the army of northern Germany, in which he held a command during the war with France in 1870-71, receiving at its close the rank of count. He became field marshal in 1873 and was made minister president of Prussia, but retired from public life in 1874. He is the author of a number of books on military geography.

ROOSEVELT (rō'ze-vělt), Theodore, twenty-fifth President of the United States, born in New York City, Oct. 27, 1858. He descended



THEODORE ROOSEVELT.

from a family of Hollanders that for generations has been noted for its philanthropy, public spirit, and high intelligence. Klaas Martensen van Roosevelt, from whom he is seventh in descent, emigrated from Holland to New Amsterdam (now New York) in 1649, and became prosperous

burgher in the settlement. Several members of the family were prominent in State politics, and Robert B. Roosevelt, uncle of Theodore Roosevelt, served in Congress a term of years and was United States minister to the Netherlands. The latter is the son of Theodore Roosevelt, Sr., and Martha Bullock Roosevelt. He graduated from Harvard University in 1880 and spent some time traveling in Europe. In 1881 he was elected to the New York Legislature, serving in that body for four years. Though a delegate to the Republican convention in 1884, he joined the Independents in supporting Grover Cleveland for President. In the same year he removed to Medora, N. D., where he conducted a ranch until 1887. Returning to New York, he was appointed a member of the United States civil service commission in 1888, a position he filled with much ability until 1895, when he resigned to become president of the New York City board of police commissioners. This position he resigned in 1897 to become Assistant Secretary of the Navy.

At the outbreak of the Spanish-American War he entered the army as a volunteer and aided in organizing a regiment popularly known as the Rough Riders, of which he was a lieutenant colonel. It consisted of volunteers from all trades and walks of life and rendered distinguished services in the Santiago campaign, particularly in the charge of San Juan Hill. In 1898 he was the Republican nominee for Governor of New York and in the November election defeated his Democratic opponent, Judge Van Wyck, with a majority of 18,079 votes. He was nominated for Vice President of the United States by the Republican national convention at Philadelphia in 1900, and after an active canvass in many of the states the ticket received a large majority of the popular and electoral votes.

At the death of President McKinley he succeeded to the Presidency, taking the oath of office in Buffalo, N. Y., at 3:36 o'clock on Saturday afternoon, Sept. 14, 1901. On Dec. 3 of that year he issued his first message to Congress, in which he outlined clearly his policy relative to the national government. In 1904 he was elected President over his opponent, Alton Brooks Parker, with a plurality of 2,524,244 votes, the largest in the history of the country. Among the events of his administration are antitrust legislation, the great anthracite coal strike of 1902, the treaty to complete the Panama Canal, the establishment of the Department of Commerce and Labor, and the conclusion of the Treaty of Portsmouth, N. H., which terminated the Russo-Japanese War. In 1909 he was succeeded by William Howard Taft and immediately went upon a hunting tour through the tropical region of Africa. He began his tour of the continent at Mombasa, British East Africa, and returned home by way of Europe. In 1912 he was the Progressive candidate for President, but was defeated, receiving 69 electoral votes.

Roosevelt became President at a younger age than any of his predecessors. His administration of the Presidency was characterized by an unusual vigor and enthusiasm. In 1916 he was a prominent factor in the Presidential campaign, although the Republican nomination was given to Charles Evans Hughes. He is the author of many books on historical, political, and general topics. They include "Hunting Trips of a Ranchman," "The Winning of the West," "Life of Gouverneur Morris," "History of New York City," "The Naval War of 1812," "Essays on Practical Politics," "The Rough Riders," "Life of Oliver Cromwell," "The Deer Family," "Life of Thomas H. Benton," "The Wilderness Hunter," and "The New Nationalism."

ROOT, in mathematics, such a number or quantity which, multiplied by itself one or more times, produces a given quantity; thus, 3 is a root of 9, since $3 \times 3 = 9$. If a given number is used twice as a factor, the product is called the second, or square, root of that number; if used three times, it is called the third, or cube, root; if used four times, the fourth, or biquadrate, root, etc. The term root is used in algebraic expressions to represent the value or values of the unknown quantity or quantities, which value

or values, substituted in the equation, will make the two members of it identical. To discover this value or these values is the object proposed in the solution of the equation.

ROOT, in botany, that organ which usually penetrates the earth, to imbibe from it nourishment suitable to the growth of the plant. In its development it divides itself into branches which are called rootlets, or fibers, and which terminate in smaller and hairlike ends of a spongy tissue. No true root produces buds or leaves, even if exposed to the air and light; if roots apparently do so, they are to be regarded as subterraneous stems. The potato tuber is a familiar example of a swollen subterranean stem, though usually called a root; and some cacti and orchids have long, tough, aërial roots. Sometimes these are adventitious, as in the rootlets which issue from the lower joints of the Indian corn and from the joints of the grape vine.

Roots are either annual, biennial, or perennial, according as they perish in one or two years, or survive for several years, but even these conditions depend in a degree on climatic circumstances. Some that are normally perennial change to annual, as in the garden nasturtium, in which case a single season is sufficient to produce flowers and seeds, and others naturally annual are made biennial or perennial, by preventing the flowers from expanding and the fructification from taking place. Roots are liable to change in form and size, especially under cultivation, as in the cultivated carrot, whose normal root thickens and becomes fusiform, or in the turnip, where it swells laterally and becomes broad and flat, or in the dahlia, where the fibers increase to tubers. There is little proportion of the roots to the rest of the plant, and even this diminishes, until the root entirely disappears in whole genera of the lower orders.

The office of the root is not only to find nourishment, but to excrete various substances. It possesses the extraordinary power of penetrating bodies harder than the earth. The general tendency of the root to seek an opposite direction to the stem is admitted, but the exact reason cannot be assigned. Roots are frequently the stores of nutriment for the use of the next year's vegetation. They contain gums, resins, acids, and other properties found important in medicine and the arts.

ROOT, Elihu, statesman and diplomat, born in Clinton, N. Y., Feb. 15, 1845. He graduated at Hamilton College in 1864, where his father, Oren Root, was professor of mathematics for many years. In 1865 he taught in Rome Academy, studied law, and in 1867 began a successful practice in New York. He was appointed United States district attorney by President Arthur in 1883 and was chosen by President McKinley to be Secretary of War in 1899, as successor to Russell A. Alger. He remained in this position until 1904, when William H. Taft suc-

ceeded him. Besides rendering efficient service in establishing the government in Porto Rico and the Philippines, he served as a member of the Alaskan Boundary Tribunal, in 1903. He

succeeded John Hay as Secretary of State in 1905. in which capacity he concluded many treaties with other countries. In the meantime he visited Canada, Mexico, and the leading countries of South America, making speeches to secure closer commercial relations.



ELIHU ROOT.

He was elected United States Senator in 1909, serving until 1915, and in 1917 served as commissioner to the new Republic of Russia.

ROOT, George Frederick, musical composer, born in Sheffield, Mass., Aug. 30, 1820; died at Bailey's Island, Me., Aug. 6, 1895. He studied music in Boston and New York and taught in the latter city until 1850. In the same year he went to Paris, where he studied music a year, and after returning to America engaged in writing music. In 1859 he entered the firm of Root and Cody, in Chicago, which published his songs and pieces of music. Among his popular songs are "There's Music in the Air," "Hazel Dell," "Just Before the Battle, Mother," "Tramp, Tramp, the Boys Are Marching," "Battle Cry of Freedom," "Rosalie, the Prairie Flower." His larger works include "The Pilgrim Fathers," "The Hay-makers," and "Belshazzar's Feast." The University of Chicago granted him a degree in 1872.

ROPE, the name of cordage formed of twisted fibers, such as fibers of flax, hemp, jute. cotton, or other vegetable species. The name is applied in an extended sense to cordage made of steel, iron, or other metallic wire. In the trade the distinction between a cord and a rope, other than of wire, is based on a collection of fibers one inch in circumference, though in popular usage smaller sizes are often termed ropes. Ropes made of vegetable fibers are composed of a number of rope yarns or rope threads. They are first twisted into strands, which in most cases are twisted together to form the finished The principal kinds are known as hawser-laid, cable-laid, and shroud-laid. making a hawser-laid rope three strands are twisted left hand, the rope yarns being laid up right hand. A cable-laid rope is composed of three strands of hawser-laid rope twisted right hand. A shroud-laid rope is made of four strands, three strands being twisted round a

central strand. In cases where great strength is needed a series of hawser-laid ropes is formed into a *flat rope* by being placed side by side and fastened together by sewing.

The vegetable fibers used in rope making are derived largely from tropical countries. They include such fibers as the coir, secured from the husk of the cocoanut, the sisal hemp from South America and the manila or wild plantain produced largely in the Philippines. Formerly rope making was carried on mainly by hand, but now machines are used for making all kinds of cordage. Ropes are made with great care, because uniformity of strength is necessary, for, as in a chain, the strength of a rope depends upon its weakest place. Among the improvements of recent times is the manufacture of wire ropes, which are made from a number of wires twisted together. The strongest wire ropes are made of steel, but iron and other metals are used also, and to preserve them against rust a galvanic coating is applied. Ropes are used for various purposes in connection with mining, farming, manufacturing, and other productive enterprises. Metal ropes are used quite extensively in rigging ships, in elevators, and for many purposes in

mining.

RORQUAL (ror'kwal), the largest genus of the whale family, found in the Arctic Ocean. It is distinguished from the Greenland, or right, whale by the presence of a dorsal fin, and by having nearly parallel longitudinal folds extending between the arches of the lower jaw, from the under lip along the chest and abdomen. The largest species is the great northern rorqual, found chiefly off the northern coast of Asia and Europe, and it is probably the most bulky and powerful of living animals. The body is longer and more slender than in the right whale, and the head is about one-fourth the length of the body. It attains a length of 90 to The food consists of crustaceans, 110 feet. medusae, and fishes. According to Desmoulins, a large quantity of pilchards and 600 good-sized cod have been found in the stomach of a single whale. The blubber is much thinner than in the right whale, hence it is comparatively of less value, and the yield rarely exceeds eight to ten barrels of oil. The longest baleen plates seldom measure four feet, hence it yields much less whalebone than the right whale. Two or three species have been described, all of which are active and restless, and they blow so violently as to be heard a great distance in calm weather. Fossil remains of small species of rorqual are found in regions that are now above the level of the sea.

ROSA (rō'zà), Salvator, painter, born near Naples, Italy, July 21, 1615; died March 15, 1673. He studied art in his native city and in 1633 went on a tour through the southern part of Italy and Sicily. Two years later he went to Rome, where he was patronized by officials high in the church and the state. Many of

his productions relate to the wild and romantic scenery associated with the banditti of Sicily. He left about ninety etchings and a large number of excellent portraits. Among his best known works are "Prometheus," "The Conspiracy of Cataline," and "Saul and the Witch of Endor."

ROSACEAE (rô-zā'sē-ē), an important family of plants, including herbs, shrubs, and trees. This family embraces not less than 90 genera and 2,000 species, most of which are native to the North Temperate Zone. It includes a large number of beautiful and useful plants, many of which are cultivated very extensively for their fruit and for ornamentation. To this family belong the almond, apricot, apple, blackberry, cherry, peach, pear, plum, quince, raspberry, rose, and strawberry. The fruits are wholesome, except that of the cherry laurel, which is poisonous, and the kernels of the stone fruits have poisonous properties. These plants are distinguished by having regular flowers, seeds without albumen, and alternate leaves with stipules. Many of the species furnish articles of use in medicine, these properties being derived from the bark in some, from the roots in others, and from the flowers and fruits of still others. See Rose.

ROSAMOND (rŏz'â-mond), mistress of Henry II. of England, born about 1140; died in 1177. She was the daughter of Lord Clifford and lived at Woodstock. Her brothers, desirous of advancing their own fortunes, first brought her to the notice of the king, who frequently visited her. When Queen Eleanor discovered the friendship between her and the king, she became jealous, but Rosamond died soon after, presumably from the effect of a poisoned dagger. William Longsword, Earl of Salisbury, was the son of Rosamond and Henry II. She was buried in the Church of Goodstone, or Godstow, but Hugh of Lincoln caused the remains to be removed in 1191.

ROSARIO (rō-sa'rē-ō), a city of Argentina, on the Paraná River, 170 miles northwest of Buenos Ayres. It is the capital of the Province of Santa Fe and the second city of Argentina. The climate is temperate and healthful. It is finely located, has convenient railroad facilities, and is the center of a large interior and river trade. Among the manufactures are soap, flour, lumber products, furniture, utensils, leather, and machinery. The streets are regularly platted, intersecting each other at right angles. They are well paved and lighted with gas and electricity. The city has a fine cathedral, numerous other churches, and a number of schools, hospitals, academies, and institutions of higher Population, 1916, 234,860. learning.

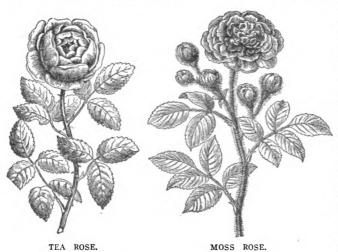
ROSARY (rō'zà-ry), the name of a popular form of prayer in the Roman Catholic Church, applied generally to the bunch or string of beads used in counting such prayers. The beads are of various sizes and material, usually made

2450

of stone, wood, or ivory. A complete Dominican rosary contains 150 small beads, separated into groups of ten or fifteen large beads, the small ones being used for the aves and the large ones for the paternosters. An ordinary rosary consists of fifty small beads, which are divided into groups by five large beads, hence a full rosary is formed by repeating three times. Every tenth ave is used in saying the doxology. The Pope, bishop, or some other dignitary or priest blesses the rosary before it is used. The rosary in its present form was introduced by Saint Dominic, the founder of the Dominicans, in the first half of the 13th century. Both Buddhists and Mohammedans use a string of beads for counting their prayers. The string of the Mohammedans has 99 beads, which they drop while pronouncing the 99 names of God occurring in the Koran.

ROSCIUS, Quintus, Roman comedian, born at Solonium, near Lanuvium, about the year 105; died in 62 B. C. He had the advantage of the friendship of many Romans belonging to the nobility. Sulla gave him a gold ring. Cicero spoke of him in terms of the highest praise and affection. It is said that Roscius and Cicero practiced the art of expressing thought in the most elegant form, the former by his gestures and the latter by his words.

ROSE, the common name of plants of the genus Rosa and its natural order Rosaceae (q. v.). They have prickly stems and un-



equally pinnate leaves. About fifty species in a wild state have been described, most of which are confined to the North Temperate Zone, but by cultivation about 1,000 species have been secured. These include both simple and double flowers and a large variety of colors. Some of the species differ so materially from those in a native state that they are difficult to

of the species differ so materially from those in a native state that they are difficult to classify. The rose is easily cultivated, requiring sunshine, rich soil, and plenty of moisture.

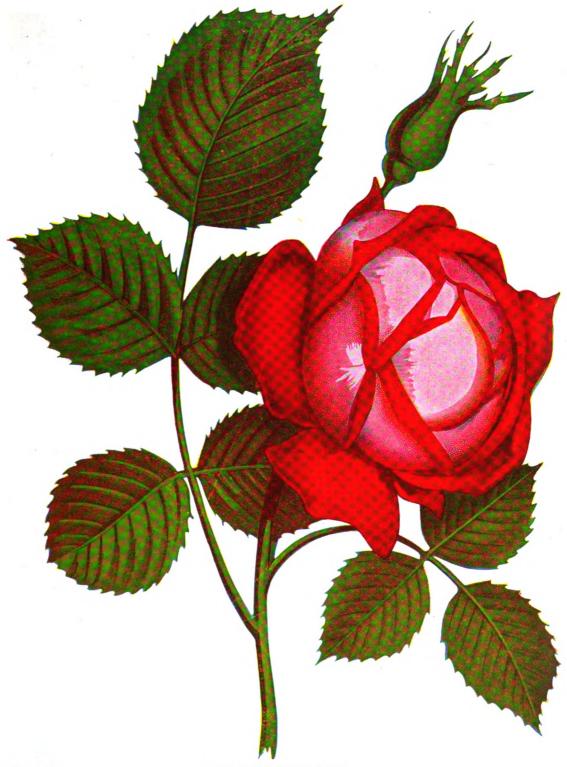
Among the common species are the tea, damask, sweet brier, yellow, musk, Provence, moss, evergreen, and monthly. The American Beauty is an elegant species originated in the United States, and is cultivated for its fragrant and beautiful, large flowers. Some species, as the common climbing rose, may be trained to ascend arches, arbors, and trellises. Poets have made the rose famous, oratory has been enriched with its virtues, and it has long been the emblem of reserve and faithfulness. It is the most beautiful and fragrant of flowers. Many millions of roses are sold annually in the market, being among the most popular of the cut flowers. Attar (q. v.), or otto of roses, is the most important product, but roses also possess medicinal properties. See Perfumes.

ROSE ACACIA, an ornamental shrub of North America, found in the mountains of Mexico and the United States. It is a species of locust, has very large inodorous flowers, and bears pods that are covered with coarse hair. The plant is native to the southern part of the Allegheny Mountains, but is now cultivated as an ornamental shrub.

ROSEBERY (rōz'bēr-ĭ), Archibald Philip Primrose, Earl of, statesman, born in London, England, May 7, 1847. He graduated from Oxford University, and in 1868 succeeded his grandfather as fifth earl. In 1872 he was made a commissioner to Scotland, became rector of the University of Edinburgh in 1880, and served

as undersecretary of State from 1881 to 1883. He was Secretary of Foreign Affairs in the Gladstone administration in the beginning of 1886, but held the position only six months, until the fall of Gladstone's government. Rosebery took a position strictly in accord with the Home Rule policy and effectually defended it in a number of able speeches. In 1889 he was elected for the city division of the London county council and in 1892 succeeded Gladstone as Premier, a position he held until the Liberals went out of power, in 1895. He was made lord rector of the University of Glasgow in 1899. books include "Sir Robert Peel," "The Last Phase," and "The Questions of Empire."

ROSECRANS (rō'zē-krănz), William Starke, distinguished soldier, born in Kingston, Ohio, Sept. 6, 1819; died near Redondo, Cal., March 11, 1898. He graduated from the West Point Military Academy in 1842 as a classmate of John Pope and James Longstreet, and served as professor of engineering and natural philosophy at West Point from 1844 to 1847. He resigned this position in the latter year and retired to private life as an architect and civil engineer, but volunteered at the be-



(Opp. 2450)

AMERICAN BEAUTY ROSE.

Notice both the Bud and the Flower.

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ginning of the Civil War, in 1861, and was commissioned brigadier general in the regular army. In 1862 he became major general of volunteers and commanded a division of the army of the Mississippi, taking part in the battles of Iuka and Corinth. Soon after he was made commander of the army of the Cumberland, taking part in the Battle of Stone River, Tennessee, and at Chickamauga and Chattanooga, being defeated in the two last named engagements by General Bragg with a loss of 16,000 men. He was soon after succeeded by General Thomas, pending the arrival of General Grant, and in 1864 became commander of the department of the Missouri, expelling General Price from that State.

In 1867 Rosecrans resigned his position in the army and was mustered out with the rank of brevet major general. President Johnson appointed him minister to Mexico in 1868, but the following year he engaged in railroad construction and settled in California. He served in Congress as a Democrat from 1881 to 1885 and was register of the United States treasury the next eight years. Rosecrans was regarded a good strategist and military leader, his removal from command being due largely to unavoidable circumstances. Congress, in 1889, restored him to full rank and pay as brigadier general and placed him on the retired list.

ROSEMARY (rōz'mā-ry), an evergreen shrub of the mint family, which is native to Southern Europe and Western Asia. It is from three to eight feet high, has narrow, opposite leaves, and bears pale blue flowers. All parts of the plant have an aromatic flavor. The leaves have a pungent taste and yield an essential oil, called oil of rosemary, which is used as an aromatic perfume and in cookery. It possesses medicinal properties of use in headache and mental weariness, and is an essential ingredient in a perfume called Hungary water

ache and mental weariness, and is an essential ingredient in a perfume called Hungary water. Spain is noted for the prolific growth of the rosemary, which furnishes good bee pasture and may be smelled many leagues off the coast.

ROSENKRANZ (rō'zen-kränts), Johann

ROSENKRANZ (rō'zen-kränts), Johann Karl Friedrich, educator and author, born in Magdeburg, Germany, April 23, 1805; died June 17, 1879. In 1828 he completed the course of study at the University of Halle, where he graduated with honors, and in 1833 succeeded Kant as professor of philosophy at Königsberg. He belongs to the Hegelian school of teachers and is the author of many books which have been extensively translated and read by school-teachers and others as authoritative works on pedagogical and historical subjects. His writings include "History of Culture," "History of German Poetry in the Middle Ages," "Subjective Psychology," "Hegel as the National Philosopher of Germany," "History of Literature," "Esthetics of the Ugly," and "Goethe and His Works."

ROSES, Wars of the, the contest between

the houses of Lancaster and York for supremacy in England. It constituted a disastrous warfare, with short intervals of peace, for thirty years, from 1455 to 1485. The former chose the red rose as an emblem and the latter chose the white, hence the name. The house of Lancaster had been in possession of the throne for three generations, attaining to the crown in 1399 and being represented successively by Henry IV., Henry V., and Henry VI. latter began to exhibit weakness of mind in 1454 and Parliament accordingly appointed Richard, Duke of York, protector of the realm during his illness. Richard had already advanced claims to the throne and, on the recovery of Henry, he declined to give up his power and vigorously organized to maintain it by force of arms. In 1455 the Battle of Saint Albans was fought between the contending parties, in which the king's army was defeated and he became a prisoner.

The queen of Henry, Margaret of Anjou, immediately organized a force in the north of England and won the Battle of Wakefield, in which the Duke of York was defeated and slain. Soon after Edward, son of the Duke of York, raised an army and eventually defeated the forces of the queen, becoming Edward IV in 1461. He was compelled to leave England shortly after by the army raised under the direction of Queen Margaret and the Earl of Warwick, when Henry VI. was restored, but Edward returned in 1471 and defeated Warwick at Barnet and the queen at Tewkesbury, both being among the slain. Edward was succeeded by his son, Edward V., who, with his brother Arthur, was murdered in the Tower and Richard III. became king. His reign ended with the Battle of Bosworth in 1485, in which he was defeated and slain by the Earl of Richmond, who succeeded him as Henry VII.

ROSETTA STONE (ro-zet'ta), the name of a stone found near the city of Rosetta, Egypt, by a French engineer in 1798. It consists of black basalt and bears an inscription of the year 196 B. C. in honor of Ptolemy Epiphanes. The inscription forms a key to the reading of the hieroglyphic characters. It is in the British Museum. The city of Rosetta is near the mouth of the Nile, thirty miles west of Alexandria. Population, 1917, 18,648.

ROSEWOOD, the name given to various hard, close-grained woods derived from different species of trees, so called from their roselike scent when newly cut. Most wood of this class is dark-colored with several shades and stripes, and is used extensively in the manufacture of furniture and cabinet products. It is heavy and expensive, and is employed principally as veneers and for ornamental purposes. The finest quality is produced in Brazil and other South American countries, but there are also productions of it in the West and East Indies.

ROSICRUCIANS (roz-i-kru'shanz), the name of a secret society organized in Würt-temburg, Germany, in the 17th century, whose aim was to vitalize and prolong human life. The moving spirit in this society was Johann Valentin Andreae, a Lutheran divine, who founded it upon reports published by a certain Christian Rosenkreutz in relation to discoveries made in Egypt. The latter spent a large portion of his life among the Brahmans, in the pyramids of Egypt, and in Western Asia, gathering while abroad much information in regard to the modes of life in the East. Some writers have connected the society with the Freemasons and other fraternities and it is generally termed the Honorable Order of the Rosa Cross. The leaders extended their organization to many countries of Europe, but they are now looked upon as impostors who laid claim to supernatural powers.

ROSIN (rŏz'ĭn), a substance obtained by distilling a mixture of water and turpentine. Crude turpentine from cone-bearing trees, such as the pine, yields from 65 to 90 per cent. of rosin. It is translucent when entirely freed from water and the odor is similar to that of turpentine. Large quantities are manufactured in British Columbia and some parts of the United States, especially in North Carolina and Florida. It is used mainly in making soap, sealing wax, varnishes, basilicon ointment, and adhesive plasters and cements. See Resins.

ROSS, Alexander Milton, naturalist, born in Bellville, Ontario, Dec. 13, 1832; died Oct. 27, 1897. He studied and practiced medicine in New York City and served as a surgeon in the Federal army of the United States during the Civil War. Soon after the close of the war he returned to Canada, where he collected and classified the flora and fauna of that country. His collections of plants and animals contain about ten thousand species. In 1881 he aided in founding the Society for the Diffusion of Physiological Knowledge. Several governments decorated him with awards and medals. He published "Birds of Canada," "Recollections of an Abolitionist," "Flora of Canada," "Vaccination a Medical Delusion," and "Mammals, Reptiles, and Fresh-Water Fishes of Canada.'

ROSS, Sir James Clark, explorer, born in London, England, Feb. 15, 1800; died April 3, 1862. He was a nephew of Sir John Ross, entered the navy in his twelfth year, and accompanied his uncle on two voyages to the Arctic Ocean. In 1831 he discovered the north magnetic pole and was made post captain. He commanded an expedition to Baffin Bay in 1836 and three years later made a voyage to the Antarctic seas, approaching within 160 miles of the south magnetic pole. Ross discovered the volcano Mount Erebus in 1841, having sailed southward from New Zealand with the Erebus and the Terror, and gave the region the name of Victoria Land. In 1843 he returned to Eng-

land, where he was knighted, and in 1848 made an unsuccessful search for Sir John Franklin in Baffin Bay. He published "Voyage of Discovery in Southern Seas."

ROSS, Sir John, Arctic explorer, born at Inch, in Wigtonshire, Scotland, June 24, 1777; died Aug. 30, 1856. He was the son of a minister and entered the navy when but ten years old, serving fifteen years as midshipman. In 1818 he became captain and accompanied Parry on an expedition to the Arctic regions, the aim being to explore Baffin Bay and find a northwest passage. He commanded an expedition to the same region in 1829, when he discovered the peninsula of Boothia Felix, and on his return to England was knighted. He became consul at Stockholm in 1838 and was made rear admiral in 1851. Among his writings are "Treatise on Navigation by Steam," "Residence Region," and "Letters to Young Sea Officers."

ROSSETTI (rôs-sěťtě), Christina Georgina, poetess, born in London, England, Dec. 5, 1830; died Dec. 30, 1894. She was educated under private tutors and at an early age gave evidence of much ability in producing poetical writings. In her early work she was aided by her brother, Dante Gabriel Rosetti, but her glowing imagination and spiritual insight soon made her independent. Her writings are in a sense serious and reflective, but give evidence of genius and mystic qualities. Critics accord her a place next to Mrs. Browning among the women writers of England in the 19th century. Her chief works include "Called to be Saints,"
"The Face of the Deep." "Speaking Likeness," "Up Hill," "The Princess's Progress and Other Poems," and "Maude: Prose and Verse."

ROSSETTI, Dante Gabriel, painter and poet, born in London, England, May 12, 1828; died April 10, 1882. He was the eldest son of Gabriele Rossetti, studied at King's College, and in 1848 joined Hunt, Millais, and others in establishing the brotherhood of Pre-Raphaelites. He exhibited his beautiful "Girlhood of the Virgin" in the free exhibition in 1849. Soon after he began to produce many works of merit, a number being exhibited the year after his death at the Royal Academy. His principal paintings include "Dante's Dream," "Venus Verticordia," and "Salutation of Beatrice." His poetical writings are better known and appreciated than his paintings, some having been widely translated. The principal poetic works include "Hand and Soul," "The House of Life," "Dante at Verona," and "King's Tragedy and Other Ballads." His brother, William Mitchel Rossetti, born in London, Sept. 25, 1829, is noted as a poetical writer. After studying at King's College, he entered the English civil service and joined his brother and others in the promotion of Pre-Raphaelitism. His principal writings include "Collected Works of Dante Gabriel Rossetti," "Lives of Famous Poets," and "Wives of Poets." He edited "Selections from the Poems of Walt Whitman" and lectured on art.

ROSSETTI, Gabriele, eminent author, born in Vasto, Italy, Feb. 28, 1783; died in London, April 26, 1854. He studied in the University of Naples, but the unusual political excitement then prevailing caused him to flee as a refugee to England in 1824. There he devoted himself to a studious literary career and published a number of works of merit. He was professor of Italian literature in King's College, London, and an influential lecturer for many years. His principal works include "Commentary on Dante," "Beatrice and Dante," and "Poetry of Gabriele Rossetti."

ROSSINI (rôs-sẽ'nė), Gioachino Antonio, dramatic composer, born in Pesaro, Italy, Feb. 29, 1792; died Nov. 13, 1868. He was the son of a strolling player and entered the Lyceum of Bologna in 1807, where he studied with great industry. It may be said that he was largely self-taught, since he gave all his leisure time to the study of Italian and German masters. His first musical production, "Tancredi," was played at Venice in 1813 and possesses such merit that he at once rose to fame and honor as a composer. He visited Berlin, Vienna, and London in 1824, and in the same year settled at Paris, where he became connected with the Italian theater the following year, holding a high-salaried position until 1830. Later he resided at Bologna and Florence, but returned to Paris in 1855, where his death occurred. His body was removed to Florence in 1887. Rossini attained great popularity and wealth. His principal productions include "William Tell," "Barber of Seville," "Semiramide," "Othello," and "Stabat Mater."

ROSSITER (ros'si-ter), Thomas Prichard, painter, born in New Haven, Conn., Sept. 29, 1817; died May 17, 1871. He studied art in a studio of his native city, where he afterward established an art gallery, and in 1840 went abroad. After studying and practicing his art in Rome, Paris, and other European cities for six years, he returned to open a studio in New York. From 1853 to 1856 he was abroad, chiefly as a means to promote art work, and in the latter year won a gold medal at the Paris exposition. He returned to the United States in 1856 and soon after settled permanently in Cold Harbor, N. Y., where he died. His best known paintings include "Venice in the 15th Century," "Return of the Dove to the Ark," "Home of Washington," and "The Wise and Foolish Virgins."

ROSSLAND (rŏs'land), a city of British Columbia, six miles north of the international boundary, on the Canadian Pacific and other railroads. It is located in the western part of the Kootenay mining district and is surrounded by a region that produces large quantities of gold, silver, and copper. The noteworthy buildings include the high school, the Allen Hotel,

the city hall, and several fine churches. It has flour mills, bottling works, engineering works, and an electric power and light plant. Twelve miles distant by rail, at Trail, are large smelters. Rossland has a large trade in merchandise and manufactures. Population 1916, 6 859

manufactures. Population, 1916, 6,859.

ROSTOCK (rōs'tōk), a city of Germany, in Mecklenburg-Schwerin, on the Warnow River, sixty miles northeast of Lübeck. It is six miles from the Baltic Sea, has a good harbor, and is connected with interior Germany by important railroads. Rostock has an active trade in cereals, live stock, fish, timber, salt, and merchandise. The principal manufactures include leather, cotton and woolen goods, chemicals, machinery, pottery, lime, toys, and clothing. The University of Rostock was founded in 1419. Rostock is the birthplace of Blücher and contains a colossal monument to that eminent military leader. Population, 1910, 65,377.

ROSWELL, county seat of Chaves County, N. M., about 160 miles southeast of Santa Fé, on the Santa Fé Railroad. The industries include cereal mills, stockyards, and machine shops. Among the chief buildings are the courthouse, high school, public library, city hall, and federal building. It has a large shipping trade in farm produce. Population, 1910, 6,172.

ROT, the name of a class of diseases that affect many plants. They are due to the attacks of fungi or other low vegetable organisms. These diseases are variously named, depending upon their nature and the plants they affect. Root rot is a disease of many cultivated plants and frequently proves injurious to the grape and forest trees. It is due to the growth of some of the larger fungi, which attack the roots and cause them to decay. Black rot is peculiar to grapes and causes the leaves and fruit to turn black in spots and finally die. Bitter rot causes brownish or blackish spots in apples, while tomato rot causes the fruit to decay when nearly ripe. The tissues of wood are destroyed by dry rot, which is due to the fungi attacking the timber kept in damp places, such as the supports in cellars, mines, and foundations of buildings.

ROTATION OF CROPS (rô-tā'shun), the name applied to the practice of changing from year to year the crops cultivated in a given field. It is practiced chiefly to maintain or increase the fertility of the soil, from the fact that plants differ in their habit of growth and in the proportion of elements necessary for their maturity. For instance, the productiveness of a field decreases from year to year if wheat is grown continuously, but if the crops are rotated, that is, if wheat, oats, corn, and clover are alternated, the productiveness is maintained to a considerable extent or even improved. Rotation of crops differs materially in different sections, owing to the crop suited to the soil and climate. Corn, potatoes, cotton, or any crops that can be cultivated act to free the ground

from weeds, while deep-rooted plants, such as clover and alfalfa, draw their nutrition largely from great depths, hence tend to mellow the soil and leave the surface enriched. Insects and diseases that affect one crop do not destroy another. For instance, chinch bugs and rust injure barley and wheat, but do not affect corn cultivated on the same ground the following year. Agriculturists aim to grow crops that can be consumed upon the farm rather than those that are sold, and in this way enrich the soil by associating the cattle industry with the cultivation of the soil.

ROTHSCHILD (roths'child), the name of an eminent family of bankers, so named from Zum Rothen Schilde, meaning To the Red Shield, the sign of the house in which their ancestors lived in Frankfort, Germany. Mayer Anselm, the founder of this great financial house, was born in Frankfort-on-the-Main in 1743 and died in 1812. He was a German of Jewish extraction and was the first to assume the name of Rothschild. After receiving an education for the position of a rabbi, he won the confidence of the landgrave of Hesse, who intrusted him with the care of \$5,000,000 during the French invasion of 1806. He was allowed the free use of this vast sum and, by putting it out at interest, not only prevented the French from securing it, but was enabled to lay the foundation for the great wealth now possessed by his posterity. Afterward he associated his sons with him in the banking business, and the family has since been connected closely with the financial affairs of Europe. His five sons were the financial kings of Europe at the time of his death, and they and their descendants have continued to gain in wealth and influence ever since. Anselm Mayer von Rothschild (1773-1855) became the head of the Frankfort bank. The others were established at different financial centers as follows: Solomon Mayer (1774-1855), at Vienna; Nathan Mayer (1777-1836), at London; Karl Mayer (1788-1855), at Naples; and Jacob Mayer (1792-1868), at Paris.

Frankfort is the common center of the Rothschild system of banks, and no business of magnitude is transacted without communicating with headquarters. The business consists mainly of making loans on a large scale, such as those negotiated by governments, railroad companies, and corporations looking forward to the building of canals and other great enterprises. However, the company also does a general banking business. A splendid example of their ingenuity is seen in their employment of swift-sailing boats, carrier pigeons, and telegraphic communications for the purpose of ascertaining the fortunes of battles in the time of great conflicts, thus enabling them to turn their speculative enterprises to good account. An enterprise of this kind conducted by Nathan Mayer in connection with the Battle of Waterloo gave the banking house information of the great contest several hours before it reached England, and from this fact the institution gained about \$1,000,000. Austria created the five brothers barons in 1822, and several members of the family have been similarly honored in Germany and England. Lionel Nathan (1808-1879) was the first Jew to enter Parliament (1858) and his son, Baron Nathaniel von Rothschild (1840-1915), was made a peer in England in 1885. A large number of hospitals and educational institutions have been endowed by different members of the family.

ROTTERDAM (rot'ter-dam), a city and river port of the Netherlands, the second city of the kingdom, 45 miles southwest of Amsterdam. It is situated on both sides of the Maas River, fifteen miles from the North Sea, and is intersected by a splendid system of canals, thus giving it advantages of vast importance. It has extensive electric railway and railroad facilities. The trade is the most important in the Netherlands, aggregating annually a vessel tonnage of 13,750,000 tons, a figure excelled by only a few cities of the world. The export trade is principally in manufactured goods, provisions, mineral waters, and spirits, while the imports consist of cotton, coffee, spices, sugar, and dyewoods. Among the manufactures are beet sugar, ironware, jewelry, cotton and woolen goods, soap, vinegar, liquors, sailcloth, windmills, and machinery. The city is supplied with electric and gas lights, stone and asphalt pavements, sewerage, waterworks, and rapid transit.

Rotterdam is well built and is divided into two parts by the main thoroughfare, known as Hoog Straat. It has fine gardens and parks, numerous charitable and educational institutions, and many fine monuments. The Saint Laurence Church is a Gothic structure of the 15th century and the Museum Boyman's is a celebrated building, but was partially destroyed by fire in 1863. Other features include the commercial exchange, the courthouse, the townhall, the post office, the central railroad station, and the public library of 145,000 volumes. In the Great Market is a bronze statue of Erasmus. Other statues are dedicated to Tollens, De Witt, and the engineer Stieltjes. The docks and quays are extensive and the river and canals are crossed by numerous bridges. Rotterdam was founded in 1416. Population, 1915, 480,240.

ROUBAIX (roo-bà'), a city of France, in the department of Le Nord, six miles northeast of Lille. It is a modern city, coming into importance in the last century. The Roubaix or La Marca canal furnishes connections with the Scheldt River in Belgium. It has modern municipal facilities, extensive railroad connections, and an important trade. The manufactures include cotton textiles, woolen and silk goods, beet sugar, carpets, leather, and machinery. Roubaix is the seat of the celebrated École Nationale des Arts Industriels. Population, 1906, 121,017; in 1911, 122,723.

ROUEN (roo-an'), a city of France, for-

merly the capital of Normandy, on the Seine River, 86 miles northwest of Paris. It is a beautiful and modern-appearing city, has extensive railroad and navigation facilities, and is the center of a large domestic and foreign trade. The river has been improved so sailing vessels of the largest kind can reach the city, principally by dredging, and it has a spacious and well-improved harbor. It is provided with modern municipal facilities, such as telephones and electric street railways, and has sanitary sewerage, municipal waterworks, and public baths. The public library contains 145,000 volumes. Other features include the Church of Saint Ouen, the cathedral erected by Philip Augustus, the Palais de Justice, the Hotel de Ville, and the central railroad station. Among the manufactures are silk textiles, cotton and woolen goods, cordage, chemicals, hats, paper, hardware, lace, ribbons, sailing vessels, and machinery. The Northmen took possession of Rouen in 843, and in 1066 it served as the residence of the Duke of Normandy, who in that year conquered England and established his court in London. Joan of Arc was burned here in 1431 and the spot is now commemorated by a beautiful statue dedicated to her. German troops occupied Rouen in the War of 1870-71. Population, 1906, 118,459; in 1911, 124,987.

ROUGE (roozh), the name of a cosmetic prepared from safflower and used to improve the complexion. In the market it is known as vegetable rouge. This product is btained from drying the leaves and then pulverizing and digesting them in a weak solution of carbonate of soda. Into this is placed some finely carded cotton, and the alkaline mixture is neutralized with lemon juice or vinegar. A solution of soda is used to wash the color out of the cotton, when it is again precipitated with vinegar, or citric acid. To the solution is added a quantity of finely powdered chalk, which becomes colored and gives body to the preparation. Jewelers use a preparation known as rouge to polish their wares. This product is obtained by calcining sulphate of iron in a high temperature, after which it is washed with water until it ceases to affect litmus paper.

ROUGE-ET-NOIR (roozh-a-nwar'), the name of a game played with cards. It is so called because it is played upon a table marked with two spots of red and black, the name meaning red and black. The game is played principally at the fashionable watering places of Europe and is a favorite among those who practice gambling.

ROUGHRIDERS (ruf'rid-erz), the name of a regiment of volunteer cavalry organized by Theodore Roosevelt and Leonard Wood for service in the Spanish-American War. The former was first assistant secretary of the United States navy at the beginning of the war and induced many cowboys from the states lying west of the Mississippi to join the organization. This regi-

ment took an active part in the battles of El Caney and San Juan. In 1899, a patriotic society of Roughriders was organized, to which the members of the regiment and their descendants are eligible.

ROULETTE (roo-let'), a game of chance played with a small ivory ball on a table. A revolving disc is located in the center of the table, the sides of which are divided into 38 compartments painted half red and half black. The compartments are numbered from one to thirty-six, besides a zero and a double zero. Players place their wager upon one of the compartments, and, if the ball falls into the compartment of their choice, they receive thirty-six times their stake. A player may bet on two or more numbers, depending upon the rules of the game. Roulette is usually associated with public gambling.

ROUNDERS (round'erz), a game of ball played extensively in England as an outdoor exercise. Each side has nine players, who alternate as the in and the out sides. The ground is platted into a square, which has three goals and a batter's station. It is the aim of the batter to drive the ball as far into the field as possible and run completely round the goals, or make as many goals as possible. The batter has three strikes, but must run the third time whether he hits the ball or not, and is declared out if the ball is caught in the air by one of the fielders, or he is touched by the ball before he reaches a goal. When three men are out, the side playing must take the field, while those in the field take the bat. This game is the origin of the more highly developed American game of baseball.

ROUNDHEADS, the name given as a mark of derision to the Puritans, or supporters of Parliament, during the Civil War in England, from their fashion of wearing the hair short. The Cavaliers, or adherents of Charles I., wore their hair in long ringlets.

ROUND TABLE, the name given to the fraternity of knights which were associated with Arthur, King of the ancient Britons. They were so called from the round table at which they took their seats in his palace. See Arthur.

ROUSSEAU (roō-sō'), Jean Baptiste, eminent lyric poet, born in Paris, France, April 10, 1670; died in Brussels, Belgium, March 17, 1741. He was the son of a shoemaker and, after attending several educational institutions in Paris, began to write lyric poetry for the theater. Later he wrote a large number of songs and epigrams, many of which have passed down to the present time and still hold their popularity. Rousseau was banished from France in 1712 for making a charge against a contemporary writer, having previously been convicted of libel. Subsequently he lived in Switzerland most of the time, but afterward settled at Brussels, where he formed the acquaintance of

Voltaire. His complete works were collected

and published in 1820.

ROUSSEAU, Jean Jacques, distinguished French author, born in Geneva, Switzerland, June 28, 1712; died in Paris, France, July 2, 1778. He descended from a French family that had settled in Geneva a century before his birth as Protestant refugees. His father, Isaac Rousseau, was a watchmaker and his mother died shortly after his birth. He was tenderly cared for in infancy by a sister of his father, and at the age of ten years was placed under the care of a Protestant minister at Boissy, where he remained two years, and in 1725 became apprenticed to an engraver in Geneva.

As a youth Rousseau was studious, but he soon formed undesirable habits for want of a fixed home, especially while under the care of the Geneva engraver, a violent and harsh man. In 1728 the impulsive youth fled from the real or fancied severity of his principal and found a home with Madame de Warens, who resided at Annecy. She sent him to a charity school in Turin. While at this institution he embraced Catholicism, and afterward again made his home with Madame de Warens. He went to Paris in 1741 to seek his fortune, where he earned his livelihood as a clerk and in copying music, but in 1743 was made secretary to the French ambassador at Venice. Two years later he resigned and returned to Paris to engage as a musical copyist and to become a student of sciences. After forming the acquaintance of Grimm, Vasseur, Diderot, and D'Holbach, he began to write

for Diderot's "Encyclopédie."

In 1750 the attention of Rousseau was attracted to a prize offered by the Academy of Dijon for the best essay on the question "Has civilization tended to improve the morals?" and wrote the essay that secured the prize In it he took the position that civilization has not only failed to purify manners, but has been the cause of much misery and crime afflicting mankind. His next writing consisted of an operetta, in 1752, to which he wrote the music. Soon after he issued a publication called "Letters on French Music." He returned to Geneva in 1754 and again embraced Protestantism, but went back to Paris soon after to devote the remainder of his life almost exclusively to literary work. His writings are principally of a political character and exercised a remarkable influence in forming public opinion to hasten the French Revolution. Among the views expressed by him are the belief that monarchy is a form of tyranny, that all men are born equal, that the possession of vast property is a crime to society, that the soil is the common heritage of all, and that religion is largely superstitious and traditional. France being in a state of revolution and change, Rousseau was compelled to flee to Neuchâtel and other places for safety, and in 1766 he proceeded to England, where he formed the friendship of Boswell and Hume. In 1767 he returned to France and supported himself by writing and copying music, but lived in great poverty until

Three works of Rousseau are noted particularly for their widespread effect upon public opinion and the trend of public thought, though to us they appear rather sentimental, a fact to be attributed to the particular characteristics of his age. The first of these is "Julia," or "The New Héloise," a romance that appeared in 1760. It awakened an enthusiasm for a return to nature in the recognition of rights and training of children. His remarkable work, entitled "The Social Contract," is the second of these, which supplied the governmental theories of the French Revolution and had a marked influence on the public thought of America. It announced that laws are not binding unless they are agreed to by all the people, suggested the word citizen, and supplied the cry of "Liberty, Equality, and Fraternity" for the French Revolution. "Emile," or "On Education," is his third great work, in which he dealt with educational ideas that fell upon fruitful ground and commended themselves to the study of such eminent teachers as Pestalozzi and Froebel. Many of the details of his plan of education appear fanciful, but this work was the means of turning the hearts of the parents to the children, and awakened in them a vivid idea of the importance and value of family life and parental care. He deprecated the practice of fashionable mothers committing their own children to the care of peasant foster mothers, instead of nursing their babes, while his whole ideal of education is democratic instead of aristocratic. This work is read and quoted largely by teachers and educational writers. Other works from the pen of Rousseau are "Discourse on Arts and Sciences," "Letters from the Mountain," "Confesences," "Letters from the Mountain," "Confessions," "Rousseau's Dream," and numerous criticisms and musical productions.

ROUSSEAU, Lovell Harrison, lawyer and soldier, born in Lincoln County, Kentucky, Aug. 4, 1818; died Jan. 7, 1869. His education was limited to the common schools, but later he studied law and was admitted to the bar. He was a member of the Indiana Legislature from 1844 to 1845, became a member of the State senate in 1847, and soon after organized a company of Indiana troops for the Mexican War, serving under General Taylor in the Battle of Buena Vista and several others. After the close of the war he established a criminal law practice in Louisville, Ky., where he became a member of the State senate. In 1861 he entered the Union army for service in the Civil War. and as brigadier general commanded at the battles of Shiloh and Perryville in 1862. He was soon after made major general of volunteers, and commanded a division of the army of the Cumberland at Stone River, Chattanooga, and Chickamauga. In 1865 he became a member of Congress from Kentucky, and in 1867 was

brevetted major general and sent to Alaska to assume control of the territory purchased in that year from Russia. He was assigned to the command of the department of Louisiana in 1868.

ROUSSEAU, Pierre Étienne Théodore, landscape painter, born in Paris, France, April 15, 1812; died Dec. 22, 1867. He was the son of a tailor and studied in the École des Beaux-Arts. Later he traveled extensively to study landscape and sky effects, and in 1834 made his first exhibit at the Salon, where he received gold medals in 1849 and 1854. He was decorated with the cross of the Legion of Honor in 1852. Many of his works are highly meritorious on account of their excellent properties, exhibiting trueness to nature. His landscapes are among the best, and include "Early Summer Morning" and "Alley of Chestnut Trees."

ROWAN (ro'an), Stephen Clegg, naval officer, born near Dublin, Ireland, Dec. 25, 1808; died in Washington, D. C., March 31, 1890. He came to the United States at an early age, studied at Oxford College, Ohio, and entered the United States navy as midshipman in 1826. After entering the military service, he assisted in the capture of Monterey and San Diego, in 1846, in the Mexican War, and in 1855 became commander. He served on the Potomac in 1861, and the following year commanded the fleet on Roanoke Island, securing the captaincy for capturing Fort Macon. From 1862 to 1864 he commanded the New Ironsides off Charleston. He was voted thanks by Congress soon after and in 1866 was promoted to be rear admiral. In 1872 he was made commander of the naval station at New York, president of the board of examiners in 1879, and superintendent of the naval observatory in 1882.

ROWAN TREE. See Mountain Ash.

ROWING, the art of propelling a boat or vessel by means of oars. The term rowing applies properly to the method of propelling a vessel by a number of men, each of whom handles an oar and is known as an oarsman, while the act of handling an oar by each hand is called sculling, and such oars are properly sculls. Rowing by means of oars was formerly an important enterprise and anciently much freighting was done by this means, but civilized nations have displaced it almost exclusively by the application of electric, gasoline, and steam power. Sculling is now carried on extensively in competitive races. In the larger exercises single sculling is almost universal, but in some instances a number of scullers work in unison, usually in pairs, fours, sixes, or eights.

Rowing is an ancient pastime and economic enterprise, but it did not become prominent as a sport until about the middle of the 19th century. Crews for rowing were organized at the leading colleges of Europe as early as 1820, and boats carrying from two to eight rowers soon came into use. Races have been held an-

nually by Cambridge and Oxford since 1856. The course employed chiefly by these institutions is on the Thames, from Putney bridge to Mortlake church, or the reverse, an expanse of four and a half miles. Up to the present the honors are about equal, though Oxford has a small lead in the scores. Regattas are maintained with great success in Germany, Holland, Denmark, and Sweden, and the contests are both national and international.

Rowing associations are maintained both in Canada and the United States, and these countries have had competitive tests with various associations of England, both at Henley and on the Thames. In 1873 was founded the National Association of Amateur Oarsmen, which is one of the leading American organizations, but there are many others, including the regattas on the Schuylkill River in Pennsylvania, the Hudson River in New York, and the course

at New London, Conn.

ROWLAND (ro'land), Henry Augustus, physicist, born at Honesdale, Pa., Nov. 27, 1848; died April 16, 1901. In 1870 he graduated from the Rensselaer Polytechnic Institute at Troy, N. Y., having taken a complete course in civil engineering. He was made instructor at Wooster University, Ohio, and later was assistant professor at Rensselaer Polytechnic Institute. In 1875 he was made professor of physics in Johns Hopkins University, serving until the time of his death. To equip himself for this important position, he made an extended tour of Europe for the purpose of conducting scientific research, purchasing apparatus, and studying methods of instruction. As a physicist he takes rank as one of the most eminent of the 19th century. His investigations include a study of the magnetic properties of iron, of the solar spectrum, and of electric phenomena. He used photographic methods in the study of the spectrum and discovered the principal of the concave grating, which led him to construct an engine useful in the preparation of gratings. The Paris Exposition granted him a gold medal for the development of a system of multiplex telegraphy based on the use of synchronous motors, which has become of great value in the commercial world. Besides being a member of many learned societies of Europe and America, he was president of the American Physical Society. His publications include treatises entitled "Magnetic Effect of Electrical Connection," "Concave Gratings for Optical Purposes," "Mechanical Equivalent of Heat," "Magnetic Permeability and Maximum Magnetization of Nickel and Cobalt," "Absolute Unit of Electrical Resistance." and "Relative Wave Lengths at the Lines of the Solar Spectrum.'

ROYAL GORGE, a celebrated cañon in Fremont County, Colorado, through which flows the Arkansas River. In many places it is skirted by bluffs that rise fully 3,000 feet above the river, which pursues a rapid and tortuous

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course. The rocks are variously colored and grandly formed, giving the region a most pic-

turesque and imposing aspect.

ROYAL INSTITUTION OF GREAT BRITAIN, an organization established in London, England, in 1799. It was chartered the following year under the name of the Royal Institution for the Promotion, Diffusion, and Extension of Science and Useful Knowledge. Scientific and literary research, the diffusion of experimental science, and the application of new discoveries to the arts are the principal objects of this institution. It has a library of 60,500 volumes and is supplied with a splendid collection of apparatus and scientific instruments. The election of new members is by ballot. Many bequests have been bestowed upon the institution, but support is provided for by an admission fee and annual subscription paid by the members. Benjamin Thompson, Count Rumford, originated the idea of such an institution. Among the lecturers may be named Sir Humphry Davy, John Tyndall, Michael Faraday, Thomas Young, Thomas H. Huxley, and many other men prominent in science.

ROYAL SOCIETY, The, an association for the advancement of mathematical and physical science, whose charter name is the Royal Society of London for Improving Natural Knowledge. It is the oldest scientific society in England, founded in 1660, and thus is one of the oldest in Europe. Weekly meetings are held from November to June for the purpose of discussions, which are preceded by the reading of papers on scientific subjects, after which the discussions are general. The Philosophical Transactions, founded in 1665, is an annual in which the more important papers and proceedings are published, and The Proceedings, first issued in 1880, is a periodical devoted to publishing abstracts of papers and accounts of general transactions. Fellows are elected by the members, the election occurring annually. The society is supported by an endowment and additional support is secured by each fellow contributing annually \$20, or a life payment of The membership comprises about 550 fellows. Since its organization nearly all the eminent men of Great Britain have been enrolled. The presidents have included Sir Isaac Newton, Samuel Pepys, Sir Hans Sloane, Sir Jay Banks, and Sir Humphry Davy

ROYAL SOCIETY OF CANADA, an institution founded at Ottawa, Canada, in 1882. It was promoted by the Marquess of Lorne and others, and the first meeting was presided over by Sir William Dawson. Four departments are maintained, including those of French-Canadian literature and history; English-Canadian literature and history; mathematical, physical and chemical sciences; and geological and biological sciences. Ottawa is the usual place of meeting and the meetings are held annually in May. This association has been prominent in general

research, especially in matters of discovery and in preserving historical records. The transactions are published annually at the expense of the Dominion government.

RUBBER. See India Rubber.

RUBENS (roō'bĕnz), Peter Paul, eminent painter, born at Siegen, Germany, June 29, 1577; died in Antwerp, May 30, 1640. He was the

son of a lawyer, who diedin 1579, and his mother took him to Antwerp in 1587, where he studied in a Jesuit institution. His ability for painting began to be noticed at an early age by his aptness to produce draw-



PETER PAUL RUBENS.

ings and sketches, and he began to study art systematically in 1590. He became a master of the guild of painters in Antwerp in 1598, where he produced a number of paintings that attracted wide attention. In 1600 he proceeded to Italy to study and practice his art, spending his time mostly as court painter to the Duke of Mantua. On returning to Antwerp, he was made court painter to Archduke Albert with a good salary and soon after married Isabella Brant. Subsequently his time was devoted to the production of the masterpieces that have made him famous. Marie de' Medici invited him to France in 1621, where he designed a series of pictures illustrating the life of that princess, which were placed in the gallery of the Luxembourg. On returning to Antwerp, he was sent by Archduchess Isabella of the Netherlands on a mission to Spain to negotiate a peace treaty with Philip IV., and in 1630 was sent on a similar mission to England to treat with Charles I.

After accomplishing these missions, Rubens painted the portraits of the king, the queen, and many of the noted men of England. Charles I. of England and Philip IV. of Spain both knighted him. His wife, Isabella, died in 1626, and in 1630 he was married again, his second wife being Helena Fourment. Rubens accumulated a large fortune. He was a man of strongly marked character and his excellent and large number of productions place him at the head of the Flemish school. His paintings include landscapes, portraits, Bible subjects, historical views, and animals of all kinds. All his works are noted for their brilliancy and natural effect, many of them selling at enormous prices.

Among his most noted paintings are "Elevation to the Cross," "Descent from the Cross," "Mercury and Psyche," "Adoration of the Magi," "Assumption of the Virgin," "Massacre of the Innocents," and "Blessings of Peace." The works of Rubens are placed at about 2,500. His remains were buried in a private chapel called the Church of Saint James, in which many of his paintings may be seen and where a monument to him has been erected.

RUBICON (ru'bĭ-kŭn), a river of northern Italy, which flows into the Adriatic. It is of interest historically in connection with Caesar crossing the stream with an army in 49 B. C. The Rubicon was the boundary line that separated his province from the republic of Rome. His act of crossing the stream with an army at the outbreak of the civil war between him and Pompey constituted a declaration of war. Writers represent Caesar as hesitating before crossing the stream, and, while passing over, he is said to have uttered the words Jacta est alea, meaning "The die is cast." "Crossing the Rubicon" has since passed into proverb, and signifies the undertaking of a hazardous task. It is thought that the Rubicon is the river now known as the Fiumicino.

RUBIDIUM (ru-bid'í-um), one of the alkali metals. It was discovered by Bunsen and Kirchhof in 1860, while examining the waters of Dürkheim, Germany, by means of the spectroscope. This mineral occurs in minute proportions in association with caesium. It is silver white, is as soft as wax at ordinary temperatures, and oxidizes rapidly in the air. When raised to a dull red heat, it evolves a bluish

vapor.

RUBINSTEIN (roo'bin-stin), Anton Gregorievich, eminent composer and pianist, born in Wechwotynetz, Rumania, Nov. 30, 1830; died in Peterhof, Russia, Nov. 20, 1894. He descended from a German family of Jewish extraction, and, after receiving his first musical instruction from his mother, studied at Moscow, Paris, and Berlin. While at Paris he was instructed by Liszt and at Berlin by Dehn. After completing his studies in Berlin, he taught music in Vienna and later in Berlin, and in 1848 settled in Saint Petersburg. In 1857 he made a tour through Europe and the following year became conductor of the Imperial Concert, with a life pension, in Saint Petersburg, where he founded a conservatory of music in 1862. He visited Canada and the United States in 1872, meeting with enthusiastic receptions. Many sovereigns of Europe granted him distinguished honors. He received the insignia of the Legion of Honor in 1877 and was given a grand jubilee at Saint Petersburg in 1889. Rubinstein was prolific as a composer and masterful as a player. He differed materially from Wagner. In feeling he favored Mendelssohn and in style was quite like Schubert. Among his best known productions are the two sacred operas, "Paradise Lost" and

"Moses," the symphonies entitled "Ocean" and "Dramatic," and the operas entitled "Demon" and "Maccabees." He published "Autobiography of Anton Rubinstein" in 1890.

RUBLE (ru'b'l), a silver coin and unit of account in Russia. It began to be coined in the 15th century. The ruble is divided into 10 grievens, or 100 kopecks. In the money of Canada and the United States, the ruble has a value of 51.5 cents. Fractions of the ruble are in silver, while gold is coined in denominations of 5 rubles and of 10 rubles. Paper or bank rubles are in circulation, but these have a nominal value of

about two-thirds of the silver coin.

RUBY (ru'by), a transparent gem of a deep color, which is considered one of the most valuable of the precious stones. It is a species of sapphire, but differs from it in that the latter is of a bluish color and less hard, ruby being the hardest of all gems except the diamond. Ruby is rare, is seldom found of large size, and possesses great value. The value increases in proportion to its size. A ruby of five carats, if perfect in color, is valued at about ten times as much as a diamond of the same weight. Ruby of the kind described here is generally called oriental ruby to distinguish it from a less valuable variety known as spinel ruby. The former kind is a corundum formed largely of alumina, while the latter is an aluminate of magnesium and is inferior both in value and hardness. Jewelers often offer for sale articles of ornament containing spinel rubies, the oriental variety possessing a value too great to be generally purchased. Rubies are obtained in Burmah, Siam, Ceylon, and Australia. Inferior grades occur in America and also in the countries named. It is now possible to produce rubies chemically. The artificial kinds serve the purpose in watches equally as well as rubies produced in nature.

RUDDER (rud'der), a broad, flat device by which a boat or ship is steered, serving to change its course when swung to either side. It is hinged vertically to the stern port of a ship, or at the stern of a boat, and is so adjusted that it may be moved by means of a tiller or wheel. A rudder chain is shackled to the rudder by bolts immediately above the water line, but it is slack enough to permit the free motion of the rudder. This is necessary to prevent it from being lost in the event of its becoming detached from the

ship.

RUDE (rud), François, sculptor, born at Dijon, France, Jan. 4, 1784; died Nov. 3, 1855. He first studied in an art school in his native town and subsequently at the École des Beaux Arts, in Paris. Later he studied art in Rome, where he was awarded a prize in 1812. In 1828 he returned to Paris, where he exhibited in the Salon. He is celebrated as a representative of the modern school of arts and was steady and arduous as a worker. His productions include a great many portraits and busts, among which may be mentioned those of Napoleon, Houdon

the sculptor, Marshal Ney, and Marshal Bertrand. Other productions include "Christ on the Cross," "Love the Conqueror," "Neapolitan Fisher Boy," and "Mercury Fastening His Winged Sandal."

RUFF, or Reeve, a genus of wading birds allied to the sandpiper. These birds are widely distributed in the northern parts of North America, Europe, and Asia. They inhabit marshy places, and are migratory in their habits. The length of the body is about twelve inches and the colors are various, but they are generally variegated brown or black above and white below. In all species the bill is long and slender and the wings are short. The male is peculiar for having a long ruff, formed of feathers, around the neck in the spring, which disappears after two months, but serves during the breeding season as a defense when fighting against other males. The fights occurring at that time are for the possession of the females, which are smaller than the males, and are called reeves. Ruffs feed on worms, seeds, and insects. They breed in the coarse grasses of marshes and swamps, where they construct nests in the early spring, the brood usually consisting of four. Their flesh is edible and much sought in the

RUGBY (rug'by), a town in England, on the Avon River, fifteen miles northeast of Warwick. It is surrounded by a fertile country, has convenient railroad facilities, and is noted as the seat of the celebrated Rugby School. This institution was founded by Laurence Sheriff, a grocer and merchant to Queen Elizabeth, in 1567. It first attained a national reputation when Dr. Thomas Arnold became master in 1828. Its endowments produce about \$25,000. It is attended by about 500 students. Among the famous students were Lord Derby, Matthew Arnold, Dean Stanley, and Thomas Hughes. The last named wrote "Tom Brown's Schooldays," a book still purchased largely for home and school libraries. The town of Rugby has a number of fine churches, hospitals, and associations. It has a brisk trade in produce and merchandise. Population, 1917, 14,408.

RUGEN (rü'gen), an island in the Baltic Sea, off the coast of Pomerania, from which it is separated by a narrow channel. It is 33 miles long by 10 miles wide, and has an area of 390 square miles. The shore is very irregular, being indented by numerous bays, and the surface is generally undulating and fertile. It has no prominent elevations. Stubenkammer is the highest point, being a precipitous chalk cliff 410 feet above sea level. The principal productions include vegetables, cereals, and fish. Cattle and sheep are reared. A number of the coast towns are noted as popular resorts for sea-bathing and sight-seeing. Bergen, with a population of 6,106, is the chief town and seat of local government. The island belonged to Sweden until 1815, when it became a part of Prussia. It is now an integral part of the German Empire. Population, 1915, 48,959.

RUM, an alcoholic liquor distilled from the juice of sugar cane and from the drainings and scummings obtained in sugar making. The material used is first allowed to ferment and the liquor is then drawn off by a simple process of distillation, which is usually conducted in connection with the cane-sugar establishments. The best grade of rum is secured from the scummings taken from the sugar pans, a second grade is made from scummings and molasses, and an inferior grade is obtained from molasses alone. Rum is colorless as it issues from the still, but it is colored to suit the customer before it leaves the premises of the distiller. The most extensive productions are in connection with the manufacture of cane sugar in the West Indies and Central America, but inferior grades are made by flavoring plain spirit with rum and coloring with burnt sugar. Jamaica rum is considered the finest, but in late years the name has been applied to the best grades made anywhere. A pineapple flavor is often given to rum by bringing it in contact with sliced pineapples, when it is called pineapple rum. The French make a kind of rum known as tafia.

RUMANIA (ru-mā'nī-à), or Roumania, a kingdom in the southeastern part of Europe, one of the Balkan states. It is bounded on the north by Austria-Hungary, east by Russia and the Black Sea, south by Bulgaria, and west by Servia and Austria-Hungary. The coast on the Black Sea is about 130 miles long. It is separated from Bulgaria by the Danube. The area is 50,715 square miles.

Description. The western part is mountainous, being traversed by the Carpathians and the Transylvanian Alps. Much of the surface is a low plain, but spurs of these mountains extend some distance inland. The highlands in the northern part serve as a great wall on the Austro-Hungarian frontier, the highest peaks rising about 800 feet above sea level. These highlands are cut deeply by river channels, which flow in valleys between spurs of the mountains. In the eastern part of the country is the Moldavian plain, and the Wallachian plain occupies the entire south, both of which are highly fertile.

All of Rumania lies in the Danube basin. The drainage is toward the south and east into the Black Sea. A part of the western and most of the southern boundaries are formed by the Danube River, which turns northward near Silistria, and, after being joined by the Pruth, it forms the boundary between the province of Dobrudja and Russia. The greater part of the Danube delta is included with Rumania. It contains the celebrated wall built by the Romans under Trajan in the 2d century from the vicinity of Kustenji to the Danube. Many small streams flow south from the northern border to join the Danube, including the Aluta, the Arjesh, and the Sereth.

The climate is subject to marked extremes. The summers are hot, the autumns are dry, and the winters are cold. In winter the winds blow from the Russian steppes and in summer, from the Mediterranean, making the latter subtropical. The extremes range from 20° below zero to 98° and even 104° in the shade. Heavy snows fall in the mountains. The rainfall ranges from 15 to 22 inches, but is not equally distributed. Much of the surface is highly fertile, particularly the black earth of the Danube basin. The country has a fine growth of timber.

MINING. The country possesses great mineral wealth, especially in coal, salt, and petroleum. In the output of petroleum Rumania ranks fifth with the nations of the world, but the capital invested to promote the enterprise is almost exclusively foreign, chiefly German and Dutch. Coal of a fine quality is obtained for domestic consumption and export. Salt has been mined for centuries. Other minerals include iron, gold, copper, lead, silver, and quicksilver. Clays suitable for brick and pottery and sands fitted for porcelain and glass wares are abundant. Granite, marble, and limestone are widely distributed and these minerals are quarried to a considerable extent for construction purposes. In Moldavia and Wallachia are beds of salt that have a thick-

ness of 700 feet. Salt mining is a state monopoly.

Agriculture. The lands were almost exclusively under feudal ownership from remote antiquity until 1864, when the government provided a popular loan of its resources to the people. Under it the peasants have come into possession of small farms, consisting mostly of ten-acre tracts, and the loan is being rapidly repaid under an installment system with low interest. Fully 70 per cent. of the people are engaged in farming and stock raising, but the methods are still primitive. Wheat and maize are the principal crops, the former being grown on 6,000 and the latter on 7,000 square miles. Other important crops include barley, oats, rye, tobacco, hemp, and vegetables. Fruit growing receives marked attention, especially grapes, prunes, and apples. Sheep are grown in large numbers in the highlands in the north, where grazing is profitable. Cattle are reared for meat and dairving. Other live stock includes horses, swine, and poultry.

Manufactures and Commerce. Formerly a large part of the manufactured products were produced in small establishments, but the factory system is developing rapidly. Flour is made in large quantities for export. Sugar is manufactured of beets and is sufficient to supply the home demand. Butter and cheese of a superior grade are made, both from the milk of cows and goats, and in the output of wines Rumania vies with Hungary. Extensive petroleum refineries are operated. Other manufactures include soap, leather, cement, glass, cloth and hosiery, furniture, machinery, and cigars. Foreign trade is largely with Austria-Hungary, Germany, France, and Great Britain. Flour,

wines, hides, and fruits are the principal exports. The imports include textiles and metal manufactures.

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COMMUNICATION. The Danube is important as a highway of commerce, since it furnishes a continuous route from the Black Sea to the western border. It has been improved in many places by dredging and the construction of canals. Deep-water navigation on the Danube extends to Galatz and Braila. Kustendje, on the Black Sea, has direct railway communication with the interior, where lines of railroads extend in all directions, furnishing communication with commercial centers in Russia and Austria-Hungary. About 2,550 miles of railways are in operation and these are owned by the state. Bucharest, Jassy, and other cities have electric railways, many of which extend to rural districts and interior towns.

GOVERNMENT. The government is a constitutional monarchy and the king holds his office by heredity. He is assisted by a cabinet of eight members and has power to veto acts of the legislature. Legislation is vested in a congress of two houses, the senate and chamber of deputies, members of both branches of which are chosen by electoral colleges. The senators, of whom there are 120, are elected for a term of eight years. This branch includes the heir apparent, two representatives selected by the universities of Jassy and Bucharest, and eight bishops. In the chamber of deputies are 183 members, all chosen for four years. Rumania is divided into 32 districts for local government. It consists of the three provinces of Moldavia, Wallachia, and Dobrudja, all of which are under state or provincial governments.

EDUCATION. Though school attendance is free and compulsory, illiteracy among the adult population is about 88 per cent. No schools have been established in many of the village communes, hence education is still backward and the school attendance is comparatively small. Two universities are maintained, one at Jassy and one at Bucharest, the former having an attendance of 800 and the latter having an attendance of about 4,100 students. Secondary schools have been provided in many of the towns and cities, but the normal training of teachers is still greatly neglected.

INHABITANTS. The Rumanians call themselves Romani and are descendants from a colony of Romans established by Trajan. At present the language spoken is constituted of many dialects, but they may be classed generally with the Romanic tongues. The Greek population is 15,500; the Magyar, 50,000; the German, 85,000; the Bulgarian, 110,000; the Gypsy, 200,000; and the Jewish, 425,000. Religious worship is free, but Orthodox Greek is the state religion, to which the people generally belong. The Protestants number 27,000; the Mohammedans, 30,000; the Roman Catholics, 132,000; and the Hebrews, 300,000. Bucharest is the capital and the largest

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Other important cities include Jassy, Galatz, Braila, Craiova, and Ploësti. Population, 1906, 6,585,534; in 1914, 7,508,009.

HISTORY. The region now included in Rumania formed part of Dacia in ancient times. Trajan made it a province of Rome in 106 A. D., when extensive Roman colonies were established. It was overrun by the military hordes of barbarians, including the Goths, Huns, Bulgars, and Slavs, in the early centuries of our era, all leaving traces of their occupation on the people and architecture to the present time. The Bulgarian kingdom annexed it in the 9th century, but it was joined to the Eastern Roman Empire, in 1019, and soon after became a part of Turkey. Turkish occupation was disturbed at various times by insurrections and wars. With the beginning of hostilities between Russia and Turkey, in 1768, Turkish influence began to wane. This may be attributed to the fact that both the Rumanians and Russians belong largely to the Greek church, and Russia claimed a protectorate over its fellow Christians against Turkish atrocities committed in the Balkan region.

The Crimean War (q. v.) was followed by the Treaty of Paris, in 1856, which, while recognizing the suzerainty of Turkey, added a part of Bessarabia to the principalities of the Danube and made ample provision for maintaining the rights and privileges of the Balkan States. Moldavia and Wallachia were united under one ruler in 1858, and three years later a national union was formed under a prince. At the beginning of the Russo-Turkish War, in 1877, Rumania permitted the free passage of Russian troops across its territory with the understanding that the scenes of hostilities were to be as much as possible outside the limits of the principality. This action at once caused Turkey to proclaim war against the Rumanians.

Moldavia and Wallachia were provinces of Turkey for many years, but secured an independent government after the Russo-Turkish War. The Treaty of Berlin, in 1878, recognized the independence of the two united provinces and approved the annexation of Dobrudja, in return for which Bessarabia was ceded to Russia. Charles I. was chosen Lord of Rumania in 1866 and was proclaimed king in 1881. On his death, in 1914, he was succeeded by Ferdinand I., the present king. Rumania joined the Entente Allies in 1916 and met defeat, being compelled to negotiate an armistice in 1918.

RUMELIA (roo-mē'li-à), or Roumelia, a region of Southern Europe, extending from the Black Sea to Albania and from the Balkan Mountains to the Aegean Sea. Eastern Rumelia long formed a part of Turkey, but, by the Treaty of Berlin, in 1878, its government under Turkey became autonomous and the following year it united with Bulgaria. See Bulgaria.

RUMFORD, town of Oxford County, Me., 50 miles northeast of Augusta, on the Androscoggin River and on the Maine Central Railroad. It has

large paper and pulp mills. The chief buildings include the public library, high school, and Mechanics' Institute. It was settled in 1892 and incorporated in 1895. Population, 1910, 6,777.

RUMINANTS (ru'mi-nants), the name of a large group of grazing animals, distinguished in that they chew a cud. They were classed as Ruminantia by Cuvier, but are now regarded as a group of the cloven-hoofed, or even-toed, ungulates. Nearly all the animals of this group have a stomach composed of four distinct bags, or cavities, but in some it is divided imperfectly into four chambers, while in others there are only three cavities. When grass or other food is swallowed, it passes by the gullet into the largest cavity of the stomach, called the paunch, or rumen, where it is soaked with a fluid. The second pouch, which is connected with the gullet, receives the fluids direct, though in some species a part of the liquids enter into other cavities. A direct connection also exists between the gullet and the third pouch, which is lined with a membrane which has many deep folds and hard tubercles. The fourth cavity, called the reed, or rennet, is lined with a mucous membrane that secretes the gastric juice.

The food passes at the will of the animal into the first or second cavity, but such foods as hay and grasses are deposited in the former, the paunch. When this is well filled and the animal is at rest, a portion is brought up and chewed slowly between the large molar teeth. This process, called chewing the cud, or ruminating, may occur when the animal is standing or laying down. After the food is chewed and thoroughly mixed with saliva, it is reswallowed and passes by the first two pouches into the third, whence it passes on into the fourth pouch and finally into the intestines. All the cloven-hoofed herbivorous animals, except the swine and hippopotamuses, are ruminants. They include the antelopes, camels, cattle, deer, giraffes, goats, musk ox, and sheep.

RUMP PARLIAMENT, the popular name given in English history to a remnant of the Long Parliament. The soldiers under Cromwell expelled three-fourths of the members of parliament on Dec. 6, 1648, these being known as the Pride's Purge, while the remaining sixty members constituted the Rump Parliament. body cooperated with Cromwell in the trial and condemnation of Charles I. After resisting certain encroachments of the army, this body was dissolved, in 1653, but was restored during the protectorate of Richard Cromwell. It was again expelled in 1659, was restored in 1660, and finally dissolved by its own decree on March 16, 1660.

RUNEBERG (roo'ne-ber-y'), Johan Ludwig, eminent Swedish poet, born at Jacobstad, Finland, Feb. 5, 1804; died at Borga, May 6, 1877. He was the son of a sea captain, who provided him with facilities for a good education, which included an extensive research in literature and a knowledge of Greek. In 1830 he was made teacher of Latin literature in the University of Åbo, a city of Russian Finland, and later in the Lyceum. Many of his poems show the influence of Goethe and Greek writers, but his originality must be conceded. It may be said that they attained the highest ideal of imaginative literature in Sweden, and reflect the deepest feelings of regard and nationalism manifest by the Scandinavian peoples. Among his best known works are "The Elkhunters," an epic idyll, "King Fjalar," "Christmas Eve," "Ensign Stals' Stories," and "Hanna."

RUNES (runz), a system of writing used among the Germanic peoples at an early date, of which mention was first made in the 6th century A. D. It consisted of sixteen letters, but the number of characters was extended later by the Germans to 24 and afterward to 40. Many inscriptions in the runes have been found in various parts of Europe. In Sweden these inscriptions are chiefly on rock or stone monuments, of which many specimens have been found in the vicinity of Upsala. These inscriptions are in Icelandic with runic characters. In Denmark verses have been found engraved upon monuments, but in some localities they are on arms, amulets, wooden tablets, and instruments of various kinds. Runic manuscripts, including a collection of laws written in the 13th century, are preserved in the library of the University at Copenhagen. An Icelandic prayer that victory should crown the arms of Herold against the Swedish king Sigurd, in 735, was discovered on a rock in the southern part of Sweden. Writings of this character were found in some parts of England, especially in the regions formerly known as Mercia and Northumbria. Since magical influences were attributed to the runic writings, they were succeeded by other systems through the influence of Christian missionaries, though a few Christian inscriptions in the runic characters have been discovered.

RUNJIT SINGH (run-jet' sing'h'), founder of the Sikh kingdom, born near Lahore, India, Nov. 2, 1780; died June 27, 1839. He was the son of Maha Singh, governor of a Sikh province, whom he succeeded at the age of twelve years, under the regency of his mother. In 1799 he assumed full power and soon subjugated many neighboring chiefs. Some of his opponents formed an alliance with the East India Company, in 1809, when a British army was sent against him and he was compelled to sue for peace. Soon after he conducted a war against Afghanistan. In 1819 he conquered Kashmir and later Peshawur, when he had himself crowned as maharajah, meaning king of kings. At the time of his death he was ruler over a region that comprised a population of 20,500,000 people.

RUNNYMEDE (run'ni-med), or Runni-mede, a narrow strip of meadow land on the bank of the Thames, in the northwestern part of

the county of Surry, England. It is memorable as the place where King John, in 1215, was compelled by his barons to grant the privileges of the Magna Charta. This tract of land now contains the Egham race course, so named from the town near by.

RUNYON, Theodore, soldier and diplomat, born in Somerville, N. J., Oct. 25, 1822; died Jan. 27, 1896. He graduated from Yale University in 1842, was admitted to the bar in 1846, and soon after established a lucrative practice in Newark, N. J., where he held several important city positions. The State authorities employed him to codify the militia laws of New Jersey, in 1856, and soon after he was made major general of the national guard of that State. He commanded a brigade of volunteers at the beginning of the Civil War, but soon after returned to the law practice. From 1873 to 1887 he was chancellor of State. In 1893 he was appointed minister to Germany by President Cleveland and later was made ambassador to the same country. Runyon received the degree of law from Yale University and from Wesleyan and Rutgers colleges.

RUPEE (ru-pe'), a silver coin of British India, the standard unit of exchange in that country. It was first coined in 1542, but the value and fineness varied somewhat in different periods and various portions of the country. The rupee is equal to sixteen annas, while 100,000 rupees equal a lac, and 100 lacs make a crore. Formerly the nominal value was about 50 cents, but the depreciation of silver causes it to fluctuate between 30 and 48 cents. The denominations coined are one, half, quarter, and eighth rupees.

RUPERT (roo'pert), Prince of Bavaria, third son of Frederick V., King of Bohemia, and of Elizabeth, daughter of James I. of England. He was born at Prague, Hungary, Dec. 18, 1619; died in London, England, Nov. 29, 1682. In 1630 he entered the University of Leyden and afterward took an extensive course in languages and military discipline. He was made master of arts by the Oxford University in 1636. Two years later he took part in the siege of Breda. In the Battle of Lemgo the Austrians took him prisoner, when he was confined for three years at Lintz. After being released, in 1642, he proceeded to England, where he was made commander of a regiment in the Civil War by Charles I. His career promised to be of value to the royal cause from the first, since he was daring in leading his army, but he was extremely rash in venturing into battle against great odds.

Prince Rupert fought with remarkable activity at Worcester, Edgehill, and Brentford and routed the Scots at Marston Moor, but was defeated by Cromwell's Ironsides. In 1645 he succeeded in a number of other battles, but was besieged at Bristol and was compelled to surrender after a siege of three weeks. Charles became impatient at his losses and had him

court-martialed, but he was cleared from blame and reinstated. Rupert won a number of victories soon after, but was captured at Oxford. He sailed to France at the demand of the Parliament, where he was made marshal, and, after receiving a wound at Armentières, in 1647, he accompanied the Prince of Wales to The Hague.

Charles soon after made Prince Rupert admiral of the fleet for remaining true to the royalists, and he sailed on an expedition of organized piracy against his opponents. However, most of his vessels were destroyed in a battle, and he was defeated by Admiral Blake at Malaga in 1651. He escaped with the remaining vessels to the West Indies, where he was joined by his brother, Maurice, and the two practiced piracy upon English and merchant vessels until 1653, when he returned to France. In 1660 he returned to England and four years later sailed as commander of a fleet against the Dutch in Guiana, where he gained signal victories and received the thanks of the House of Commons. Rupert devoted the later part of his life to scientific study. He is the inventor of a form of gunpowder and the discoverer of improvements in the art of mezzotint engraving. He was the first governor of the Hudson Bay Company. From him the curious glass bubbles known as Prince Rupert's drops derived their name.

RUPERT'S LAND, an extensive region of Canada, so named from Prince Rupert, who was one of the founders and first governor of the Hudson Bay Company. The region includes what is now Manitoba, Alberta, Saskatchewan, and a large part of Keewatin. Subsequently it was transferred to the Hudson Bay Company and in 1870 was admitted into the Dominion of Canada. See Hudson's Bay Company.

RUSH, the name of several plants belonging to the Sedge family. Most species are grasslike herbs with jointed stems. They are either leafless or bear flattened, knotted leaves and greenish or brownish flowers. The common rush has a perennial root and the stem is filled with a spongy pith. A species known as black grass is cut for hay early in the season. Many of these plants are valuable in the industries, since they furnish material for mats, thatching, twine, and chair bottoms. They grow in moist meadows and swampy places.

RUSH, Benjamin, eminent physician, born in Philadelphia, Pa., Dec. 24, 1745; died April 19, 1813. He descended from a family of Quakers that came to America with William Penn in 1683, and, after graduating at Princeton in 1760, he studied two years in Edinburgh, Scotland, where he secured a degree in 1768. Soon after he returned to America. He became professor of chemistry in the Philadelphia Medical College and at the same time built up a reputation as medical practitioner. In 1774 he joined James Pemberton in founding the first antislavery society in America, and became noted as a leading spirit in the political movements pre-

ceding the Revolution. He served as a member of the Continental Congress, in 1776, and was a signer of the Declaration of Independence. Until 1778 he was physician general of the army, and in 1787 sat as a member of the Philadelphia convention that adopted the Federal Constitution. Rush was versatile as a writer and eminent as a physician. His last public office was that of treasurer of the United States mint in 1799, serving in that position until 1813. Among his numerous writings are "Diseases of the Mind," "Medical Inquiries and Observations," and "Medical Tracts."

RUSK, Jeremiah McLain, soldier and statesman, born in Morgan County, Ohio, June 17, 1830; died in Viroqua, Wis., Nov. 21, 1893. He was brought up on a farm and attended school in Ohio, but removed to Wisconsin in 1853 and engaged in farming. In 1862 he entered the Union army, serving until the close of the war. He attained to the rank of brigadier general in 1865. He was bank comptroller of Wisconsin from 1866 to 1870, served as a Republican in Congress from 1871 to 1877, and was Governor of Wisconsin from 1882 until 1889. President Harrison made him Secretary of Agriculture in the latter year, and at the close of his term he retired to Viroqua.

RUSKIN (rus'kin), John, prose writer and art critic, born in London, England, Feb. 8, 1819; died Jan. 20, 1900. He was the son of a

wealthy wine merchant and was instructed privately until he entered Oxford University, where he graduated in 1842. While at school he manifested a taste for literature and art. After graduating, he studied painting under Copley Fielding and received inspirations from the noted works of Rembrandt and



JOHN RUSKIN.

Rubens. His whole life was one of busy study and work, and it may be said to have been quite as uneventful as that of a teacher and writer usually is. The first work from his pen was his "Modern Painters," in 1843, but previous to that he had published his poem on "Salsette and Elephanta," which gained the Newdigate prize at Oxford. In the "Modern Painters" he discussed the principles of art and called attention to the superiority of modern painters to the older masters. This work was published in five volumes, the last appearing in 1860, thus forming a very comprehensive treatise on the subject. He next passed to a study of architecture, which resulted in his "Seven Lamps of Architecture," in 1849, and followed it by his "Stones of Venice," the last volume of the latter appearing in 1853. About that time he lectured on drawing, defended PreRaphaelitism, and wrote books on political economy. He made contributions to periodicals and prepared treatises on social, art, and ethical subjects.

Ruskin lectured at Cambridge a number of years, was professor of fine art at Oxford, and founded Saint George's Guild at Oxford, an institution designed to inculcate a habit in young and old to do manual labor. He became the publisher of his own books in 1873, finding it more agreeable to his particular taste in securing the exact composition and printing that he desired. It may be said of Ruskin that few lives present greater lessons of industry than his, while few writers have attained to such lofty enthusiasm for truth and beauty. None have shown greater eloquence and force, or exhibited a more generous sympathy for the needy and those wishing to make the best of life. His books are read and studied with enthusiasm both in America and Europe, and have found their way into many school and home libraries. nost noteworthy not named include "The King of the Golden River," a fairy story; "The Crown of Wild Olive," essays on work; "Sesame and Lilies;" "Pleasures of England;" "Mornings in Florence;" "Ethics of the Dust;" "Elements of English Prosody;" "Queen of the Air;" "Two Paths;" "Poetry of Architecture;" "Saint Mark's Rest;" and "Arrows of the Chase."

RUSSELL (rus'sĕl), Sir Charles Arthur,

eminent jurist, born near Newry, Ireland, in 1832; died Aug. 10, 1900. He descended from a family of Roman Catholics, four of his brothers entering the service of the church. After studying at Dublin University, he turned his attention to law, but in 1851 sought greater possibilities in London. He first engaged as a reporter on several papers, studying law in the meantime, and was admitted to the bar at Lincoln's Inn in 1859. His success was assured by reason of industry and ability, rising to become Queen's counsel in 1872, and in 1880 he was chosen a member of Parliament. There he supported the Home Rule policy of Gladstone in a masterful and influential way, was knighted in 1886, and in 1894 was made Lord Chief Justice of England as successor to Lord Coleridge. He visited Canada and the United States in 1896 and delivered an address before the Bar Association of America, at Saratoga Springs, N. Y., on "International Arbitration." Lord Russell ranked as a persuasive and energetic speaker. He presided over the trial of Leander Starr Jameson, in 1896, and subsequently over other equally noted cases.

RUSSELL, John, Earl, statesman, born in London, England, Aug. 18, 1792; died May 28, 1878. He was the third son of John, sixth Duke of Bedford, studied at the University of Edinburgh, and in 1813 was elected a member of Parliament. His influence became assured from the first by reason of his eminent ability as a speaker. He attracted much attention by an address in opposition to a union of Sweden

and Norway. In 1819 he delivered an address in favor of parliamentary reform, a question in which he took special interest during his entire political career, and in 1830 assisted in framing a reform bill. He became Home Secretary in the second Cabinet of Lord Melbourne, in 1835, and was made Colonial Secretary in 1839, introducing many important bills during the period. When Peel began to agitate the Corn Laws, Russell opposed him with much vigor from 1841 to 1845, but in the latter year wrote a letter in favor of repealing the Corn Laws, which, on being published, caused general discussion in England. Peel resigned in 1846 and Russell formed a new ministry, which remained in office until 1852, when it fell on account of the famine and a rebellion in Ireland. He entered the office of Foreign Secretary under Lord Aberdeen the same year, and in 1855 became Colonial Secretary in the Cabinet formed by Lord Palmerston. In 1865 he succeeded to the leadership of the Liberal party, but resigned the following year because his new reform bill failed, and henceforth held no office. Russell was not only an eminent leader and statesman, but ranks high as a writer. His principal works include "History of the British Constitution," "Life of Thomas Moore," "Recollections and Suggestions," "Rise and Progress of the Christian Religion in Western Europe," and "Life and Times."

RUSSELL, John Scott, naval engineer, born at Parkhead, Scotland, in 1808; died June 8, 1882. He studied at the universities of Glasgow and Edinburgh and in 1832 became a lecturer at the latter institution. The following year he began to manufacture small steamers and steam carriages. After studying the nature of waves, he introduced the wave system into the construction of ocean steamships at London. Many large vessels were constructed under his supervision, including the Warrior and the Great Eastern. In 1873 he was the chief engineer in the construction of the vast dome at Vienna, Austria, which had an expanse of 360 feet and was one of the objects of attraction at the great exhibition. He contributed to many works of reference and published "The Modern System of Naval Architecture.'

RUSSELL, Sol Smith, actor, born at Brunswick, Me., in 1848; died in 1902. He became a drummer in the Federal army at the beginning of the Civil War and in 1864 played at a theater in Cairo, Ill. In 1865 he won much applause as a lyceum entertainer at Saint Louis. Soon after he became connected with Daly's company in New York City. For some time he starred in a play called "Edgewood Folks." Ill-health compelled him to retire from the stage in 1900. His greatest successes were made in "A Poor Relation," "A Bachelor's Romance," and "The Hon. John Grigsby."

RUSSELL, William, Lord, patriot and statesman, born Sept. 29, 1639; died July 1, 1683. After graduating from Cambridge, he traveled

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in Europe, and in 1660 became a member of Parliament. He took little part in public debates until 1673, when he became a recognized leader of the Protestants in England, and subsequently was prominent as an opponent of King Charles and the Catholics. In 1680 he joined others in planning to secure a Protestant king of England and, as a means of retaliating, the opposition accused him of being implicated in the Rye-House Plot, but it was afterward learned that he had no knowledge of this or of any plan to raise an insurrection against the king. However, he was arrested on a charge of having plotted against the king and was accordingly condemned to be executed. Many attempts were made to save his life, but, as the king would not yield, Russell himself refused every other means, though an opportunity was given him to escape. His life stands as an example of a Christian martyr. Algernon Sidney, his fellow victim, was executed before the close of the year.

RUSSELL, William Clark, novelist, born in New York City, Feb. 24, 1844; died Nov. 8, 1911. His father, an Englishman, was a favorite concert singer in New York and a composer of songs. The son was educated at Winchester, England, and in France. He began sea life as a midshipman in 1857, and as such made several voyages to Asia and Australia. In 1865 he abandoned naval employment and turned his attention to literature, contributing to several London periodicals and writing a few novels under a nom de plume. His first literary work of considerable merit was a sea tale called "John Holdsworth, Chief Mate." This was followed by other writings of the same character. He served for some time on the staff of the London Daily Telegraph, which position he resigned in 1887. His writings include "What Cheer," "An Ocean Tragedy," "Frozen Pirate, "A Sea Queen," "The Wreck of the Grosvenor, "The Romance of a Midshipman," "A Book of the Hammock," "The Yarn of Old Harbour Tower," and "Life of Lord Nelson."

RUSSELL, William Eustis, lawyer and statesman, born in Cambridge, Mass., Jan. 6, 1857; died July 16, 1896. He graduated from Harvard University in 1877 and, after attending the Boston University Law School, was admitted to the bar. After establishing a successful practice in Cambridge, he served as mayor four years, and was elected Governor of Massachusetts as a Democrat for three terms, in 1889, 1891, and 1892. Russell resumed his law practice after the expiration of his term as Governor. He was one of the leading lawyers of the State and contributed to a number of journals and magazines

RUSSELL, Sir William Howard, journalist, born in Lilyvale, Ireland, March 28, 1820; died Feb. 10, 1907. He studied at Trinity College, was admitted to the bar in 1850, and served as correspondent of the London Times in the Crimean War. It was Russell who made public the sufferings of the British soldiers in their winter quarters, which caused the British ministry to be succeeded by one pledged to military reform. He corresponded for the London Times from the beginning of the mutiny in India, in 1857. The following year he founded the Army and Navy Gazette, in which he supported progressive views in military and naval affairs. At the time of the Civil War in the United States he corresponded from America, accompanying General McDowell and others. In 1866 he reported the war between Prussia and Austria, and in 1870, between France and Germany. Later he accompanied the British army to South Africa to report the events in the Zulu troubles. He was granted the Iron Cross in Germany, the Legion of Honor in France, and in 1895 was knighted by the queen. Among his numerous writings are "Dairy in India," "Letters from the Crimea," "My Dairy North and South," and "Canada, Its Defenses, Condition and Resources."

RUSSIA (rush'a), an extensive country of Europe and Asia, embracing about one-sixth of the land area of the earth. It is about three times as large as the United States, exclusive of Alaska, and is exceeded in size only by Great Britain. The total area is 8,660,394 square miles, of which 2,095,616 square miles are in Europe. It embraces 56 per cent. of Europe and all of Northern Asia, extending from the Baltic Sea and the Gulf of Bothnia, in the West, to the Bering Sea and the Sea of Okhotsk in the East. Asiatic Russia comprises about 38 per cent. of Asia. The empire is bounded on the north by the Arctic Ocean; east by Bering Strait and the Pacific Ocean; south by the Chinese Empire, Afghanistan, Persia, Turkey in Asia, and the Black Sea: and west by Rumania, Austria-Hungary, Germany, the Baltic Sea, the Gulf of Bothnia, Sweden, and Norway. The extreme length from east to west is about 7,000 miles, this being the distance from the border of Poland to the Sea of Okhotsk, and the width from north to south is 2,175 miles. Russia includes by far the largest region lying contiguous within a single government.

European Russia is divided into fifty provinces, but Russia in Europe includes, besides these, the Grand Duchy of Finland and the ten governments of Russian Poland. Several popular designations are used for convenience in describing particular regions of Russia in Europe. These embrace South Russia, along the northern shore of the Black Sea; Little Russia, immediately north of South Russia; Great Russia, extending through the center from Little Russia to the Arctic Ocean; East Russia, lying west of the Ural Mountains and the Ural River; West Russia, bordering on the Baltic Sea and Germany; and White Russia, embracing the northwestern part. Russia in Asia embraces Western Siberia, Eastern Siberia, Turkestan, Northern Caucasia, Transcaspia, Transcaucasia, Kirghiz Steppes, Amur, and the Maritime ProvSSIA

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inces. Saint Petersburg is the capital of all the Russias and the largest city of the empire.

DESCRIPTION. Russia in Europe includes the vast region lying north of the Black Sea and the Caucasus Mountains and east of Sweden, Germany, Austria-Hungary, and Rumania. The surface consists chiefly of an immense plain, which is well watered by numerous rivers and many small streams. The Valdai Hills form the only elevated region of the interior. They are situated between Moscow and Saint Petersburg, forming the important interior watershed, though their average height is only 500 feet, and the most elevated peaks are about 1,200 feet above sea level. On the eastern boundary are ranges of the Ural Mountains, which separate Northern Europe from Asia. Between the Caspian and Black seas trend the Caucasus Mountains, which separate the valley of the Terek from that of the Kura, and on the southern shore of the Crimea are the Taurida Mountains. Mount Elbruz, 18,570 feet high, is the most elevated peak of the Caucasus Mountains and of Europe. The highest elevations of the Ural Mountains do not exceed 7,000 feet, and those of the Taurida are not over 4,000 feet.

The inland waters of Russia include a number of valuable lakes, all of which are in the northwestern part, embracing lakes Onega, Ladoga, Sego, Bieloe, Saima, Ulea, and many others. The White Sea is the principal coast indentation from the Arctic and the gulfs of Finland and Riga, from the Baltic. In the southern part is the Sea of Azov, while the Black and Caspian seas, both on the southern border, are important for supplying navigation facilities. The principal inland waters in Asia, belonging to Russia, include the Aral Sea and the lakes of Balkash, Baikal, Issyk-kul, and Chany. Most of the drainage in Europe is toward the south. The Volga and Ural rivers flow into the Caspian Sea; the Don, into the Sea of Azov; and the Bug, Pruth, Dnieper, and Dniester, into the Black Sea. The Baltic Sea receives the waters of the Vistula, Niemen, Duna, Neva, and Narova and the Arctic receives those of the northern Dwina, Onega, Petchora, and Mezen. Asiatic Russia also has a large number of important rivers, many of which are partly frozen the greater portion of the year. Those flowing into the Arctic include the Lena, Indigirka, Yenisei, and Obi. The southeastern part is drained largely by the Amur and the southwestern part, into inland seas, chiefly by the Oxus (Amu) and the Syr-daria.

CLIMATE. The climate is distinctly continental, but it is greatly diversified on account of the immense extent of the empire. The winters are colder and the summers are hotter than in the same latitudes of the countries in Europe, but the annual temperature is somewhat higher in the West than in the East. This is due to the fact that the East has a higher elevation above sea level and is influenced noticeably by the

Pacific Ocean. In the southern part the climate is favorable to the growth of sugar cane, the vine, and other fruits, but there is a gradual decrease in vegetable forms toward the north until the Arctic region is reached, where only slight traces of lichen and mosses prevail. Winds sweep across the country from the north and the south, owing to the absence of mountain barriers, and changes in temperature are quite sudden and violent.

At Saint Petersburg the mean temperature is 15° in January and 65° in July, but in the southern part, adjacent to the Caspian Sea, the summers are very hot, with extremes of 96° to 110°. Astrakhan and the country surrounding the Aral Sea have a very slight rainfall, ranging from four to ten inches per year, but it increases toward the northwest, being about twenty-two inches at Saint Petersburg. The rainfall in the entire country is given at twenty inches. Snow falls in all parts of Russia, but remains only a short time in the southern part, while the northern section has localities that are covered with snow perpetually. In general the climate is healthful and bracing, well calculated to support a hardy and vigorous people.

FLORA AND FAUNA. Few regions of equal extent have a more fertile soil than is found in the Russian possessions, but the country has vast sandy tracts, morasses, and swamps. greater part of the unproductive surface is in the vicinity of the Caspian and Aral seas, owing to the arid climate and the presence of large deserts or sandy wastes. Swamps of considerable extent abound north of Saint Petersburg, and unproductive regions stretch through the country between the Obi River and the Ural Mountains. However, a large part of both European and Asiatic Russia consists of a rich, black loam of great fertility. The forests are boundless and extend far toward the north, but the size of the trees gradually diminishes toward the Arctic seas, where only small shrubs are found in isolated tracts. Fully 40 per cent. of the country is still covered with timber, including the birch, larch, fir, alder, oak, hornbeam, maple, ash, and conifers.

In the northern section are many wild animals of large size, such as the polar bear, elk, and deer. Other animals include the wolf, lynx, wild boar, glutton, and wild fowl. The beaver is found in large numbers in the government of Minsk. Foxes, squirrels, partridges, and hazel hens are numerous in the central part. Cod and salmon are found in large numbers off the northwestern coast. Seal fishing is prolific in the Arctic. Herring, sturgeon, and other valuable fishes are taken in large numbers from the seas, lakes, and rivers. Bird life is well represented in the southern and central parts, but is very scant along the coasts of the Arctic.

MINING. Russia has deposits of practically all the minerals, and most of those which enter the important industries are found in large quanti-

ties. Mining has received attention for many centuries, but its extensive development is of comparatively recent date. Anthracite coal is mined near the Donets River. Extensive fields of bituminous coals are worked in Poland, Silesia, and many sections of Siberia. Though the annual output is 18,500,000 tons, it is scarcely sufficient to supply the demand for all purposes. Iron ore occurs in the Urals and in the central and southern parts of Russia, the annual yield being 3,500,000 tons. Copper is obtained chiefly in the Urals and the Caucasus, but productive fields are worked on a lesser scale from Finland to Poland. Russia produces more platinum than all the countries of the world combined, furnishing about 90 per cent. of the entire output. In the production of petroleum it holds a high rank, the output of crude oil averaging about 80,500,000 barrels per year. It is obtained chiefly in the celebrated fields of Baku, in Transcaucasia, which rank among the greatest sources of mineral oil in the world. The larger supply of gold is obtained in the Ural Mountains and in Siberia, where auriferous veins are worked extensively. Peat bogs furnish fuel and are worked in the vicinity of Moscow and along the Baltic. Building stones and fire and brick clays are widely distributed. Other minerals include zinc, salt, mercury, jasper, lead, manganese, amethyst, and diamonds. Amber of fine quality is found on the Baltic.

AGRICULTURE. About four-fifths of the inhabitants are engaged in agricultural enterprises, although the tundras in the north and the steppes of the Caspian are not fitted for cultivation. Besides, western Russia has large regions of unproductive salt lands. However, large areas consist of black soil of great fertility, including some of the richest wheat land in the world. Primitive methods of farming are still in vogue, but modern machinery is coming slowly into use. It exceeds any other country in the world in the production of flax, hemp, and wheat, and produces about half the rye and two-thirds of the oats grown in Europe. In the production of barley it exceeds any other country of the Old World. The larger part of the wheat grown is confined to the southwestern section, while rye and barley are cultivated extensively in the north, though they thrive in all parts where farming is possible. Maize yields well in the southwestern section, where it is rotated by seasons with wheat and oats. Fruits are grown extensively in the southern and central parts, especially apricots, apples, plums, grapes, and strawberries. Large interests are vested along the border of Rumania and the southwest in silk culture and the mulberry tree. Rice is grown to a large extent in the southern part of Siberia and the Caucasus.

In stock raising Russia surpasses any other country of Europe. It has nearly half the horses of the continent and leads all countries in the number of cattle, goats, and sheep. In the num-

ber of swine it is exceeded only by Germany. The animals live in the open air the entire year on the steppes of the southwest, but in the central part they must be sheltered and fed from three to six months. While horses are bred with much care, other domestic animals are not of a high grade. Sheep culture is particularly abundant in the arid regions of the Caspian and Aral seas, where rainfall is insufficient to insure the maturity of crops, but is adequate for the growth of excellent pasturage. Vast interests are vested in raising reindeer in the northern region, while the Tartars along the Caspian and the inhabitants of Turkestan engage extensively in rearing camels.

MANUFACTURES. It may be said that Peter the Great was the founder of the manufacturing industry of Russia, and since his time there has been a steady advance in the number of different products and the quantity produced. A high tariff is imposed by the government to protect home industries. The larger part of the factories are small and the establishments are located rather in rural than in urban districts. However, large plants have sprung up recently in the cities, which have grown rapidly in population on account of the impetus obtained by laborers coming from the country. Textiles rank as the most important products, both in the number of people employed and the value of the product. Next in value are metals, articles of food, lumber, leather, pottery, and paper. Marked attention is given to the manufacture of sugar from beets, but this industry is confined chiefly to the southern part. Silks and embroidery, pipe tobacco and cigars, chemicals, and steel and iron products are made in large quantities. The fisheries yield a large output for canning and curing, while preserved fruits and packed meats are produced in abundance. The larger manufacturing establishments are located in Lodz, Moscow, Saint Petersburg, and Warsaw.

TRANSPORTATION AND COMMERCE. Extensive means for transportation are available, including streams which are navigable for large steamers a distance of 14,250 miles and for small vessels fully 25,500 miles. Canal systems are maintained to unite the Baltic and the White Sea basins, the Baltic and the Caspian basins, and the Baltic and the Black Sea basins. Other navigable waters include the Gulf of Bothnia, the Aral Sea, Lake Baikal, the Sea of Japan, and the Sea of Okhotsk. During a short period in the summer it is possible to navigate the Kara Sea and the Arctic Ocean, but these waters are frozen or dangerous the greater part of the year. About 36,200 miles of railroads are in operation, of which 6,500 miles are in Asiatic Russia. About half of the railroads are owned by the national government and the remainder by provinces and private corporations. The Trans-Siberian Railway, extending from Saint Petersburg to Vladivostok, on the Sea of Japan, is the longest trunk line in the world. Another line extends east2469

ward from the Caspian Sea, passing to the western border of the Chinese Empire. However, the railway mileage is less in proportion to area and population than that of other European nations. A considerable mileage of electric lines has been constructed, especially in the larger

cities and more populous sections.

The domestic trade has developed without intermission the last two decades, but it has been closely paralleled by that with foreign nations. Germany controls the larger part of both the export and import trade, largely for the reason that Russian business men use the German language very extensively. Other countries that have a considerable share include Great Britain, France, Austria-Hungary, Turkey, China, and the United States. The leading imports include manufactured goods, such as textiles and machinery; articles of food, including tea and coffee; and raw cotton and cotton goods. Cereals, flour, live stock, timber, petroleum, and linseed oil are the principal exports. Owing to an old and well-established custom, a large share of the trade is conducted at great fairs, where live stock, wool, and cereals are dealt in very extensively. The principal fairs are those at Poltava, Moscow, Kharkov, Irbit, and Nizhni-Novgorod. The last mentioned is the largest fair in the empire, but Siberian goods are sold principally at Irbit, in the government at Perm.

GOVERNMENT. Russia had an absolute government until 1905, before which year the country had neither a written constitution nor a representative legislative body. Nicholas II. issued a decree, as a result of the revolution of 1905, granting constitutional government. The chief executive holds office by heredity. He bears the title of Emperor and Autocrat of all the Russias, Czar of Poland, and Grand Prince of Finland. He is limited in his ruling by certain precedents, such as the decree of Emperor Paul, in 1796, concerning the succession to the throne, and that of Peter I., requiring the emperor and princes of the royal blood to be members of the Greek Orthodox Church. Four imperial councils are maintained, including the council of state, which has superintendence of legislation, finance, and civil and church administration; the ruling senate, which has executive and judicial functions; the holy synod, which controls matters ecclesiastical; and the committee of ministers, consisting of twelve ministers, such as of public instruction, of war, of internal affairs, of foreign affairs, etc.

Since 1905 a part of the legislative functions is exercised by the duma, or national assembly, which has a membership of about 500. It is the body that represents the people in national legislation and its members are elected by the zemstvos, as the assemblies of the districts are called. Bills that are passed by the duma and sanctioned by the council of state, or council of the empire, become law when approved by the emperor. The provinces or governments of

Russia are supervised by national police, but each has certain executive and legislative functions. These include the power to manage its municipal, educational, and other general affairs, suffrage being invested for that purpose in the male citizen. Revenues are raised chiefly by issuing trade licenses, by a protective tariff system, and by the control of a large portion of the railway, telegraph, and canal business. The government derives an income from the manufacture of tobacco and sugar, which industries are controlled by it. Internal revenue on spirituous liquors and a tax on land are likewise among the resources.

RELIGION AND EDUCATION. The Greek Orthodox Church is the national church, which has a membership in Russia estimated at 80,300,000, but all sects are granted freedom of religious worship. Other denominations are represented by about 8,250,000 Roman Catholics, 3,225,000 Jews, 3,150,000 Protestants, chiefly Lutherans, 2,650,000 Mohammedans, and 60,000 Armenians. No general system of education has been established, but public schools are maintained in the provinces. Since 1888 the national authorities have been promoting the establishment of common schools, for which purpose grants have been made. Illiteracy is placed at 50 per cent, in the army, which is about the ratio of the people generally. Excellent secondary schools and academies are supported in many of the cities, and twelve noted universities are maintained. Less than half the children of school age receive public training. The nation is divided into fifteen educational districts, all under the direction of the minister of public instruction, and the common schools are supported jointly by local and general taxation. It has many normal and technical schools. A large per cent. of the higher institutions are under the direction of the Holy Synod of the Greek Catholic Church. In 1909 the number of university students was reported at 20,248.

INHABITANTS. Russia has increased rapidly in population the past fifty years, although it has a large number of races. About threefourths of the inhabitants are true Russians, who constitute a distinct Slavic group of the Caucasian stock. They are divided into Great Russians or Muscovites, Little Russians or Malo-Russians, and White Russians, who number respectively about sixty million, eighteen million, and six million. The population classed as non-Russian includes Germans, Finns, Lapps, Mongols, Jews, Poles, Iranians, Lithuanians, and Tartars. Poland is populated largely by Poles; the Baltic Provinces, by Germans; the northwestern part, by Lapps and Finns; the Caucasus, by Iranians and Georgians; Central Siberia, by Kalmucks and Buriat Mongols; the Baltic region, by Letts and by Lithuanians; and parts of Poland and western Russia, by Jews.

Saint Petersburg, the capital and largest city. is situated in the western part, on the Gulf of

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Finland. Thirty-five cities have a population of more than 50,000 and twelve exceed 100,000. The chief cities in Russia are Saint Petersburg, Moscow, Warsaw, Odessa, Lodz, Riga, and Kieff, and those in Asia include Baku, Tiflis, and Tashkend. Among the principal ports are Onega, Archangel, Helsingfors, Reval, Cronstadt, Saint Petersburg, Libau, Riga, Odessa, Kertch, Astrakhan, Tanganrod, and Baku. The latest official census gives the total population of the empire at 140,240,679, of which 105,437,895 were in European Russia. Population, 1912, 161,745,450.

LANGUAGE. The Russian language is an important member of the Slavonian family of the Aryan, or Indo-European, tongues and is the successor of the Old Slavic. It was modified remarkably by the Mongolian conquest, in 1224, and by Polish elements being introduced from the West. Modern Russian may be said to date from the time of Peter the Great, but since then many German. Dutch, and French words have been added and the grammatical construction has become modified. The language contains few conjunctions. It is peculiar for the slight grammatical connection between the sentences, but has a remarkable capacity for forming derivatives and compounds. Its alphabet has 37 letters, which form combinations and sounds difficult for foreign students to learn. The language is spoken in its purest and most grammatical form in Great Russia, of which Moscow is the literary and intellectual center. About forty different languages are spoken in the empire. The chief of these, besides Russian, are the German, Lithuanian, Finian, Turanian, and Persian.

LITERATURE. Russian literature may be said to date from the introduction of Christianity by Vladimir in 980. It was in his reign that the first ballads in Russian were written. At that time knowledge began to be disseminated by the monasteries, at which were published numerous treatises on beliefs of the church and a number of historical works. The first writing of note in the Russian is a book of the Gospels that appeared in 1056, but the military contests with the Tartars and Mongols long retarded material literary advancement. In 1560 Makarius published his "Lives of the Saints." the first writing of note after the expulsion of the Mongols and Tartars, and in 1596 appeared Zizania's "Slavic Grammar." Alexei Michailovitch authorized his prime minister to collect Russian laws, which were printed in 1644, and soon after an academy was founded at Moscow. Peter the Great established the Russian language for universal use in public business and communication and founded many schools, among them the famous Saint Petersburg Acad-The writers of the early part of the 18th century were influenced greatly by German and French writers, the most eminent writers of this period being Lomonosov (17111765). Gerhardt F. Müller, a German writer, established the first literary journal at Saint Petersburg, in 1755, and Novikov (1744-1818) published a journal called *The Painter*, through which medium he greatly enlarged the book trade.

Literature became popular in all parts of Russia in the reign of Alexander I., who was a liberal patron of progressive education and greatly increased the number of universities. Since that time other czars have done likewise, and Russian literature in all departments has been enriched by the contributions of native writers as well as by liberal translations from other languages. The most eminent poets of Russia include Alexander Pushkin, Michael Lermontoff, and Baron Delvig; the novelists embrace Feodor Michailovitch, Prince Odojevski, and Count Leo Tolstoi; the dramatists include Nikolaus Polevoi and Nestor Kukolnik; and the historians embrace Michailovoski Danileveski, Vasili Berg, and Professor Pogodin. Russian philosophy was drawn principally from German and English sources, but the country has some eminent writers in jurisprudence and philosophy, the former including Simonof and the latter Sokolof. Among the recent publications are "Russian Officials in Past and Present Times," by E. Karnovich, in 1898; "Emperor Alexander I.," by N. K. Shilder; "Dominion of Muscovite Emperors," by Alexei Michailovitch; and "Russian Books," by S. Vengerov, in 1899. Russia possesses some of the largest libraries in Europe, among which the vast collections of books at Saint Petersburg and Moscow are the most noteworthy.

HISTORY. The early history of Russia is wrapped in myth and tradition. Nothing definite is known prior to the 9th century of the Christian era. No country in the world has so great a variety of nationalities, but the chief one is the Slavonic. It is thought that eastern Slavs were the ancestors of the Russians. They settled on the northern shore of the Black Sea in the early part of the Christian era, but, being harassed continually by neighboring tribes, they invited Rurik, a Scandinavian, to come and reign over them. It appears that he and two brothers established a government in 862, in the vicinity of Kieff. The name Russes appears to have originated and came to be applied to them from Norman warriors, who served in the army of the Byzantine emperors, from the circumstance that they passed through the country. Olga succeeded to the government in 945 and in 955 she embraced the Christian religion under the patriarch of Constantinople, but in 957 abdicated in favor of her son, Sviatoslaf. The government passed to Vladimir in 980. In the 35 years of his reign he fully established Christianity as the religion, founded cities and schools, and built a number of canals and other improvements. At that time Kieff rose as a city quite equal in importance to Constantinople. His reign is counted the heroic effort of Russian history.

Vladimir was succeeded by his sons, who established a number of principalities, making it possible for the Mongols and Tartars to invade the country under Genghis Khan in 1224 and inflict material damage to its prosperity. Soon after the Russian princes became tributary to the Khan, placing Russia in an unfortunate condition, for the reason that its civilization and industries became retarded, while the peoples in the region of Poland, Livonia, and Lithuania made rapid advancement in both. This condition caused the Poles and Teutonic Knights to make invasions from the west, but both Kieff and Novgorod continued to gain in commercial importance and power. Novgorod, being an influential city, was the capital a large part of that period and was an important member of the Hanseatic League. The capital was removed to Moscow in 1328 by Ivan I., whence originated the term Muscovite. In 1481 the Tartars were expelled by Ivan III., surnamed The Great, who ruled from 1462 to 1505. He married the niece of the last Byzantine emperor, conquered Novgorod, and otherwise extended Russian dominion. Ivan IV., surnamed The Terrible, succeeded to the throne in 1533 and reigned 51 years. His armies were everywhere victorious and, after consolidating Russian territory, he became absolute ruler with the title of csar. He began the conquest of Siberia, which was finally annexed to Russia in 1699. The present Czar of Russia descended from the house of Romanoff, which came into power in 1613, and since then the empire has grown continuously in strength and commercial importance.

Alexis Michailovitch succeeded to the Russian throne in 1645, reigning until 1676. His reign was made famous by conquering Little Russia and White Russia from the Poles. In the meantime the Cossacks of Ukraine were compelled to recognize Russian supremacy, but the country was disturbed by contentions because of changes made in the liturgy of the Greek Church. However, Russia's greatness may be said to date from the accession to power of Peter the Great in 1689. His reign of 36 years was at first shared by his half-brother, Ivan, but he soon obtained absolute sway, made Saint Petersburg the new capital, and gave Russia a European rather than a Mongolian tendency. His achievements include the final conquest of Siberia. He annexed Livonia, Ingria, Esthonia, and other territory taken from Sweden by the Peace of Nystadt, in 1721, and constructed canals, encouraged agriculture, and instituted manufacturing and mining. He was succeeded by his widow, Catharine I., in 1725, but she died after a reign of two years and was succeeded by Peter II. The latter was succeeded in 1730 by Queen Anna, the daughter of Ivan, and in her reign the German party became prominent at court. Nothing of importance may be said to have occurred until the accession of Catharine II., in 1762, who reigned until 1796. Within that period Russia conducted successful wars against Sweden, Turkey, Persia, and Poland. The contests resulted in material extensions toward the east, south, and west. This accession of territory was due chiefly to the three partitions of Poland, in 1772, 1793, and 1795, by which nearly two-thirds of that kingdom became incorporated with Russia, and the annexation of the Crimea in 1783.

Freedom of worship gained a wide foothold under Paul I. (1796-1801), but he greatly retarded the progress of learning by excluding foreign publications and establishing a strict press censorship. In the reign of Alexander I. (1801-1825) many important events tended to enlarge Russian influence. These include the annexation of Finland from Sweden, in 1809; the annexation of Bessarabia from Turkey in 1812; the defeat of Napoleon at Moscow, in 1812; the annexation of part of the Caucasus, in 1813; and the final absorption of Poland, in 1815. Nicholas I. (1825-1855) annexed additional territory from Turkey and Persia and began the Crimean War. Alexander II. (1855-1881) concluded the Crimean War by the Peace of Paris, in 1856, by which Russia lost territory on the north side of the Danube and navigation advantages in the Black Sea, but in 1868 it destroyed every vestige of Polish independence.

In the meantime Russia annexed all of Turkestan, and in 1877 declared war against Turkey. This war was terminated by the Treaty of Berlin, in 1878, by which Russia regained its advantages on the Black Sea and secured Bessarabia. At the same time the Balkan States became organized as governments separate from Turkey. Alexander was assassinated through the influence of Nihilists in 1881 and Alexander III. succeeded him. The important events of his reign include the famine of 1890-91 and the expulsion of many Jews. It witnessed the beginning of the great Trans-Siberian Railroad in 1892. On the death of Alexander, in 1894, he was succeeded by Nicholas II., a young man of 27 years, who soon after married Princess Alix of Hesse. He celebrated his marriage with much pomp and made it the occasion of pardoning 20,000 state prisoners. His reign has been one of remarkable prosperity in commerce and internal improvements. The country became involved in war with Japan in 1904, owing to Russian advances in the Far East, especially in Manchuria. A feeling had become deeply rooted among the common classes of Russians that the nation was invincible. Being defeated in the formidable contest against Japan, the poorer classes rose in a widespread revolution. In the meantime the czar was compelled to grant a constitution and a legislative assembly, known as the Duma. In 1914 Russia joined the Entente Allies and at once invaded East Prussia,

but her armies were expelled and defeated, and forces of Austro-Germans penetrated the region eastward beyond Brest-Litovsk. The revolution of 1917 compelled Czar Nicholas II. to abdicate, and the country was governed by Alexander Kerensky and later by Nikoli Lenine. A treaty of peace was signed in 1918, which took Finland, Ukrania, Poland, and the Baltic Provinces from Russia, but internal and external hostilities continued to disturb the country.

RUSSIAN REVOLUTION, the movement for political and industrial reform in Russia. This movement may be said to have resulted directly from the disastrous war with Japan, which was not looked upon with favor by a very large part of the Russian people, but the causes may be traced to legislation and conditions dating back several hundred years. Every loss in the war was followed by increased agitation for change, while inefficiency and corruption caused many to lose faith in the czar and the autocratic party. Reformers took advantage of the inability of the government to sustain its sway of absolute reign, and the working classes resorted to strikes with the view of obtaining better wages and improving the conditions of living. Racial and religious riots were frequent, nihilists and anarchists sought to inaugurate a reign of terror, and in many sections the impression prevailed that the empire was on the point of crumbling into pieces. The movement was not concerted, and cannot be said to have begun at any particular time or place. Many were concerned in a line of action for popular liberty, but they did not act in harmony with each other.

The first bold stroke was made July 28, 1904, when Von Plehve, minister of the interior, was assassinated. In November of the same year representatives of the zemstvos, meaning the district or provincial assemblies, held a meeting at Saint Petersburg and adopted a memorial asking the czar for a more liberal administration and a representative government. demand was denied in a ukase of the czar, and, when a body of 100,000 people headed by Father Gapon assembled before the winter palace, Jan. 22, 1905, to present a petition to the czar, they were fired upon by troops and about 2,000 unarmed men, women, and children were killed and about 5,000 were wounded. This massacre had the effect of spreading discontent. Riots followed at Moscow, Odessa, Sebastopol, and in the cities of Poland and the Caucasus. Practically all the educated classes took sides with a movement for liberal reforms and a representative government. In February Duke Sergius, uncle of the czar, was assassinated at Moscow. Peasants rose in revolt, Jews were massacred, much of the railroad traffic and telegraph communication was suspended, a contingent of the army and navy mutinied, and the administration of the government became greatly disorganized. Finally, on Oct. 30, the czar signed a decree declaring constitutional government.

During the revolutionary movement revolts occurred in the Baltic provinces and Poland, and an organized movement for autonomy occurred in Finland. The Baltic provinces are populated by Germans and Lithuanians, and these people united and established a republic with Rega as its capital. However, the government dispatched 12,000 Cossacks to the revolting provinces and the czar proclaimed an imperial manifesto, announcing local self-government in that section. Like concessions were made to the Poles and in December a manifesto was issued granting autonomy in Finland. An extraordinary diet convened at Helsingfors Dec. 20 to consider proposals for the budget of 1906-07, provisional taxes, and a loan for railway construction; a bill providing by a new fundamental law a parliament for Finland on the basis of universal suffrage with the establishment of the responsibility of the local authorities to the nation's deputies; bills granting liberty of the press, of meeting, and of unions.

The successful termination of the revolution in Russia may be attributed in a large measure to the statesmanship of M. Witte, who served as premier and formed a cabinet pledged to support reformatory measures. The manifesto granting constitutional government is as follows:

We, Nicholas II., by grace of God Emperor and Autocrat of all the Russias, Grand Duke of Finland, etc., declare to all our faithful subjects that the troubles and agitation in our capitals and numerous other places fill our hearts with excessive pain and sorrow.

The happiness of the Russian sovereign is indissolubly bound up with the happiness of our people and the sorrow of our people is the sorrow of the sovereign.

From the present disorders may arise great national disruption. They menace the integrity and unity of our empire.

The supreme duty imposed upon us by our sovereign office requires us to efface ourself and to use all the force and reason at our command to hasten in securing the unity and coördination of the power of the central government and to assure the success of measures for pacification in all circles of public life, which are essential to the well-being of our people.

We, therefore, direct our government to carry out our inflexible will in the following manner:

First—To extend to the population the immutable foundation of civic liberty, based on the real inviolability of person, freedom of conscience, speech, union, and association.

Second—Without suspending the already ordered elections to the state duma, to invite to participation in the duma, so far as the limited time before the convocation of the duma will permit, those classes of the population now completely deprived of electoral rights, leaving the ultimate development of the principle of the electoral right in general to the newly established legislative order of things.

Third—To establish as an unchangeable rule that no law shall be enforced without the approval of the state duma and that it shall be possible for the elected of the people to exercise real participation in the supervision of the legality of the acts of the authorities appointed by us.

We appeal to all faithful sons of Russia to remember their duty toward the fatherland, to aid in terminating these unprecedented troubles and to apply their forces, in coöperation with us, to the restoration of calm and peace upon our natal soil.

RUSSIAN THISTLE, a plant common to the central part of the United States, found chiefly in the arid region lying between the Mississippi and the Rocky Mountains. Locally it is known as saltwort and tumbleweed. It thrives best in comparatively dry seasons, has a central stock with many branches, and bears small flowers of a purple color. At maturity the roots loosen and the dry plant is rolled or tumbled by the wind, causing its small seeds to scatter broadcast. In some of the states, especially in South Dakota and Nebraska, it is quite troublesome as a weed in cornfields.

RUSSO-JAPANESE WAR, the armed contest between the military forces of Russia and Japan in 1904-05. War was considered inevitable between the two contending parties several years before activities began. Japan commenced to prepare for the contest as early as 1805.

menced to prepare for the contest as early as 1895, when Russia prevented Japan from acquiring Port Arthur and the Liao-Tung peninsula as a consideration of peace following the Chinese-Japanese War. Subsequently Russia obtained possession of Port Arthur by lease and acquired control of the Chinese Eastern railway. In 1902 it was agreed by Russia that she would evacuate certain ports in Manchuria and aid in reëstablishing Chinese authority in the province as well as to restore the railways to the Chinese. Russia failed to carry out these promises and a sharp diplomatic correspondence between the two nations began in the fall of 1903, Japan insisting upon the evacuation of Manchuria and the establishment of certain Japanese claims in Corea. Diplomatic relations were severed early in 1904 and Japan, without waiting for a formal declaration of war, sent

Chemulpo in Corea.

The first hostilities occurred Feb. 8, 1904, when the Japanese made a torpedo attack upon the Russian battleships and cruisers lying outside the harbor of Port Arthur. This important place was defended by General Stoessel with an army of 45,000 men and the Russian Asiatic fleet. The Russians had planted submarine mines in the harbor of Port Arthur and the Japanese also placed mines, chiefly in the course necessary to be taken by the Russian vessels

warships and troops to Port Arthur and to

in emerging from the harbor, one of which was struck April 13 by the Russian battleship *Petropavlovsk*, causing a loss of 525 men and officers and including the artist Vereshtchagin and Admiral Makaroff. Besides suffering several sanguinary naval attacks, Port Arthur was besieged by a Japanese army of 100,000 under General Nogi. The fort capitulated Jan. 2, 1905.

Important battles were fought on the Yalu early in May, 1904, where General Kuroki with an army of 54,000 defeated 21,000 Russians under General Sassulitch and compelled a retreat in the direction of Liaoyang. Gradually the Russians were forced to fall back and abandon important strategic points, until the final engagement at Mukden, which began Feb. 24 and continued until March 12, 1905, and in which Marshall Oyama with 450,000 men defeated 410,000 Russians under General Kuropatkin. The Russians had ordered the Baltic fleet to Vladivostock in October, 1904, commanded by Admiral Rojestvensky. This great fleet reached the straits of Corea early in the spring, where it was attacked and completely defeated by the Japanese under Admiral Togo. Soon after this naval engagement steps were taken to agree upon terms of peace. President Roosevelt exercised the friendly offices of the United States and a peace conference was appointed at Portsmouth, N. H., the first session being held Aug. 9. During the war Russia had 870,000 men in the field and Japan had not less than 1,200,000. The Russian losses are given at 312,412 and the Japanese, at 210,000.

The following is a compilation of losses in the principal land battles of both armies:

BATTLE.	RUSSIAN.	JAPANESE.	TOTAL.
Yalu	3,210	1,045	4,255
Nanshan	3.280	4,250	7,530
Vafangow	4.890	1,300	6,190
Liaoyang	21.875	18,250	40,125
Sha River	67.190	16,328	83,518
Port Arthur	15,000	46,500	61,500
Heikoutai	12,600	8,940	21,540
Mukden	100,000	75,000	175,000

The peace treaty concluding the war was signed at Portsmouth, N. H., Sept. 5, 1905, and was ratified by Russia and Japan in October. In the map the southern half of Saghalien is shown shaded, which portion now belongs to Japan, and Corea is also under Japanese control. Russia has relinquished to China all of Manchuria, which is shown shaded horizontally. The Liao-Tung peninsula, including Dalny and Port Arthur, was transferred to Japan. Following is the full text of the treaty:

The Emperor of Japan on one part and the Emperor of All the Russias on the other part, animated by a desire to restore the blessings of peace to their countries, have resolved to conclude a treaty of peace, and have for this purpose named their plenipotentiaries,—that is to say, for his Majesty the Emperor of Japan, Baron Komura Jutaro Jusami, Grand Cordon of the Imperial Order of the Rising Sun, his

minister of foreign affairs, and his Excellency Takahira Kogoro, Imperial Order of the Sacred Treasure, his minister to the United States, and for his Majesty the Emperor of All the Russias, his Excellency Serge Witte, his secretary of state and president of the Committee of Ministers of the Empire of Russia, and his Excellency Baron Roman Rosen, Master of the Imperial Court of Russia, his majesty's ambassador

interfere with measures for guidance, protection, and control which the imperial government of Japan may find necessary to take in Korea. It is understood that Russian subjects in Korea shall be treated in exactly the same manner as the subjects and citizens of other foreign powers,—that is to say, they shall be placed on the same footing as the subjects and citizens of the most favored nation. It is also agreed,

in order to avoid causes of misunderstanding, that the two high contracting parties will abstain on the Russian-Korean frontier from taking any military me as ure which may menace the security of Russian or Korean territory.

Article III.—Japan and Russia mutually engage:

First.—To evacuate completely and simultaneously Manchuria, except the territory affected by the lease of the Liao-Tung Peninsula, in conformity with the provisions of the additional Article I, annexed to this treaty, and,

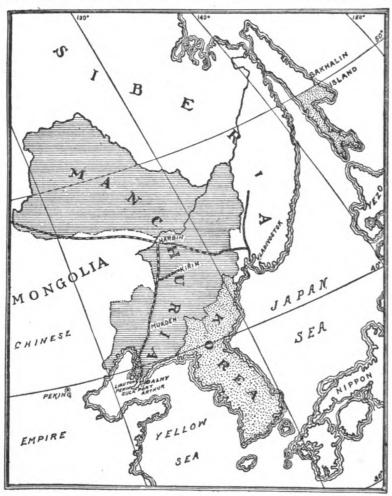
Second.—To restore entirely and completely to the exclusive administration of China all the portions of Manchuria now in occupation or under the control of the Japanese or Russian troops, with the exception of the territory above mentioned.

The imperial government of Russia declare that they have not in Manchuria any territorial advantages or preferential or ex-

clusive concessions in the impairment of Chinese sovereignty not inconsistent with the principle of equal opportunity.

Article IV.—Japan and Russia reciprocally engage not to obstruct any general measures common to all countries which China may take for the development of the commerce or industry of Manchuria.

Article V.—The Imperial Russian Government transfers and assigns to the imperial government of Japan, with the consent of the government of China, the lease of Port Arthur,



SEAT OF THE RUSSO-JAPANESE WAR.

to the United States, who, after having exchanged their full powers, which were found to be in good and due form, have concluded the following articles:

Article I.—There shall henceforth be peace and amity between their Majesties the Emperor of Japan and the Emperor of All the Russias and between their respective states and subjects.

Article II.—The İmperial Russian Government, acknowledging that Japan possesses in Korea paramount political, military, and economical interests, engage neither to obstruct nor

Talien, and the adjacent territory and territorial waters, and all rights, privileges, and concessions connected with or forming part of such lease, and they also transfer and assign to the imperial government of Japan all public works and properties in the territory affected by the above-mentioned lease. The two contracting parties mutually engage to obtain the consent of the Chinese Government mentioned in the foregoing stipulation. The imperial government of Japan on their part undertake that the proprietary rights of Russian subjects in the territory above referred to shall be perfectly respected.

Article VI.-The Imperial Russian Government engage to transfer and assign to the imperial government of Japan without compensation and with the consent of the Chinese Government the railway between Chang-Chung-Fu and Kuan-Chang-Tsu and Port Arthur, and all the branches, together with all the rights, privileges, and properties appertaining thereto in that region, as well as all the coal mines in said region belonging to or worked for the benefit of the railway. The two high contracting parties mutually engage to obtain the consent of the government of China mentioned in the foregoing stipulation.

Article VII.-Japan and Russia engage to exploit their respective railways in Manchuria exclusively for commercial and industrial purposes, and in nowise for strategic purposes. It is understood that this restriction does not apply to the railway in the territory affected by the lease of the Liao-Tung Peninsula.

Article VIII.—The imperial governments of Japan and Russia, with the view to promote and facilitate intercourse and traffic, will, as soon as possible, conclude a separate convention for the regulation of their connecting railway services in Manchuria.

Article IX .- The Imperial Russian Government cede to the imperial government of Japan in perpetuity and full sovereignty the southern portion of the island of Saghalien, and all the islands adjacent thereto, and the public works and properties thereon. The fiftieth degree of north latitude is adopted as the northern boundary of the ceded territory. The exact alignment of such territory shall be determined in accordance with the provisions of the additional Article XI. annexed to this treaty. Japan and Russia mutually agree not to construct in their respective possessions on the island of Saghalien or the adjacent islands, any fortifications or other similar military works. They also respectively engage not to take any military measures which may impede the free navigation of the Strait of La Perouse and the Strait of Tartary.

Article X.-It is reserved to Russian subjects, inhabitant of the territory ceded to Japan, to sell their real property, and retire to their country, but if they prefer to remain in the ceded territory they will be maintained and protected in the full exercise of their industries and rights of property, on condition of submitting to the Japanese laws and jurisdiction. Japan shall have full liberty to withdraw the right of residence in or to deport from such territory any inhabitants who labor under political or administrative disability. She engages, however, that the proprietary rights of such inhabitants shall be fully respected.

Article XI.—Russia engages to arrange with Japan for granting to Japanese subjects rights of fishery along the coasts of the Russian possessions in the Japan, Okhotsk, and Bering seas. It is agreed that the foregoing engagement shall not affect rights already belonging to Russian

or foreign subjects in those regions.

Article XII.—The treaty of commerce and navigation between Japan and Russia having been annulled by the war, the imperial governments of Japan and Russia engage to adopt as a basis for their commercial relations pending the conclusion of a new treaty of commerce and navigation the basis of the treaty which was in force previous to the present war, the system of reciprocal treatment on the footing of the most favored nation, in which are included import and export duties, customs formalities, transit and tonnage dues, and the admission and treatment of agents, subjects, and vessels of one country in the territories of the other.

Article XIII.—So soon as possible after the present treaty comes in force all prisoners of war shall be reciprocally restored. The imperial governments of Japan and Russia shall each appoint a special commissioner to take charge of the prisoners. All prisoners in the hands of one government shall be delivered to and received by the commissioner of the other government or by his duly authorized representative in such convenient numbers and such convenient ports of the delivering state as such delivering state shall notify in advance to the commissioner of the receiving state. The governments of Japan and Russia shall present each other as soon as possible after the delivery of the prisoners is completed with a statement of the direct expenditures respectively incurred by them for the care and maintenance of the prisoners from the date of capture or surrender and up to the time of death or delivery. Russia engages to repay to Japan as soon as possible after the exchange of statement as above provided the difference between the actual amount so expended by Japan and the actual amount similarly disbursed by Russia.

Article XIV .- The present treaty shall be ratified by their Majesties the Emperor of Japan and the Emperor of All the Russias. Such ratification shall be with as little delay as possible, and in any case no later than fifty days from the date of the signature of the treaty, to be announced to the imperial governments of Japan and Russia respectively through the French minister at Tokio and the ambassador of the United States at Saint Petersburg, and from the date of the later of such announcements this treaty shall in all its parts come into full force. The formal exchange of ratifications shall take place at Washington as soon as possible.

Article XV .- The present treaty shall be signed in duplicate in both the English and French languages. The texts are in absolute conformity, but in case of a discrepancy in the interpretation the French text shall prevail upon the details of the evacuation in conformity with the above principles, and shall take by common accord the measures necessary to carry out the evacuation as soon as possible, and in any case no later than the period of eighteen months.

Sub-Article to Article IX.-So soon as possible after the present treaty comes into force a commission of delimitation composed of an equal number of members is to be appointed, respectively, by the two high contracting parties, which shall on the spot mark in a permanent manner the exact boundary between the Japanese and Russian possessions on the island of Saghalien. The commission shall be bound so far as topographical considerations permit to follow the fiftieth parallel of north latitude as the boundary line, and in case any deflections from that line at any points are found to be necessary compensation will be made by correlative deflections at other points. It shall also be the duty of said commission to prepare a list and a description of the adjacent islands included in the cession, and, finally, the commission shall prepare and sign maps showing the boundaries of the ceded territory. work of the commission shall be subject to the approval of the high contracting parties.

In conformity with the provisions of Articles III. and IX. of the treaty of peace between Japan and Russia of this date, the undersigned plenipotentiaries have concluded the following

additional articles:

Sub-Article to Article III .- The imperial governments of Japan and Russia mutually engage to commence the withdrawal of their military forces from the territory of Manchuria simultaneously and immediately after the treaty of peace comes into operation, and within a period of eighteen months after that date the armies of the two countries shall be completely withdrawn from Manchuria, except from the leased territory of the Liao-Tung Peninsula. The forces of the two countries occupying the front positions shall first be withdrawn.

The high contracting parties reserve to themselves the right to maintain guards to protect their respective railway lines in Manchuria. The number of such guards shall not exceed fifteen per kilometer, and within that maximum number the commanders of the Japanese and Russian armies shall by common accord fix the number of such guards to be employed as small as possible, while having in view the actual requirements.

The commanders of the Japanese and Russian forces in Manchuria shall agree upon the details of the evacuation in conformity with the above

principles, and shall take by common accord the measures necessary to carry out the evacuation so soon as possible, and in any case no later than the period of eighteen months.

RUSSO-TURKESTAN, or Russian Turkestan, a large region of Central Asia, comprising the western section of what is generally known as Turkestan. The area is about 411,500 square miles. It is included in the semi-arid belt of the continent. Chains of mountains extend through the southern part, where the country has an Alpine-like aspect, but the western and northern parts are comparatively flat and sandy. Large stretches of desert make up the northern part, but oases and fertile valleys intersperse many of the ridges in the interior. The climate is continental, with dry and hot summers and cold winters. Stock raising is the principal industry. Large interests are vested in agriculture, but irrigation is depended on to a large extent. Rice, wheat, oats, millet, fruit, and vegetables are grown in abundance. The domestic animals consist chiefly of sheep, camels, horses, and goats. Rugs, carpets, clothing, and implements are the principal manufactures. The trade is largely with Russia and is carried principally by caravans and the Trans-Caspian Railroad. Taskand and Namangan are noted as trading centers. See Turkestan.

RUSSO-TURKISH WAR, a conflict between Russia and Turkey, due to a movement on the part of Russia to secure an extension of territory to the Mediterranean. Atrocities committed in Bulgaria and other Balkan states caused Russia to declare war against the Ottoman Empire in April, 1877. A treaty had been concluded between the former country and Rumania, in which Russia was made the protector of the Christians in the Balkan Peninsula. A Russian army crossed the Danube at Galatz the latter part of June and another force crossed into Bulgaria about the same time at Simnitza. The Turks under Osman Pasha had taken a strong position at Plevna, which was attacked by the Russians under General Krüdiner, but the latter were driven back with great slaughter. Suleiman Pasha defeated a Russian army under General Gerko, who was advancing upon Adrianople, and Mehemet Ali operated on the Lom River against Crown

Prince Alexander.

The center of interest was lodged at Plevna, where Osman Pasha was defeated in an attempt to escape and was compelled to surrender. Several decisive engagements took place later at the Shipka Pass, near Philippopolis, and in Armenia. The Russians began to march upon Constantinople in January, 1878, which compelled the Turks to agree to an armistice. two nations concluded the Treaty of San Stefano, by which Russia gained large advan-This caused several nations to fear tages. that an extension of Muscovite power would give Russia precedence, hence the Congress of Berlin was assembled to revise the treaty and

undertake to settle the Eastern Question. See Berlin, Congress of.

RUST, a disease that affects cereals and many species of grasses. It is due to several parasitic fungi, whose growth is favored by excessive summer heat, by fields illy ventilated, and by excessively rich manures. Wheat rust is probably the best known. It has a complex life history, consisting at first of small fungi of one cell, but later passing through various stages and merging into a form of colored dust. Wheat rust is red or black, that infesting the tobacco plant is brown, and the fungous growth attacking plants of the mustard family is white.

RUST, the coating caused by oxidation on iron and steel, especially under exposure to air and moisture. The term is applied in an extended sense to a film or oxide formed onany metal by corrosion. Bright iron does not rust in an atmosphere which is comparatively dry, but, when it has once formed on the surface, it continues to deepen rapidly, for the reason that condensation of the liquid contained in the air takes effect more easily on a rustcovered surface than on bright metal. Steel and cast iron are less easily affected by rust than wrought iron, because the latter is nearly pure iron and contains less carbon. The surface may be protected against rusting by japanning and galvanizing, or by coating it with plumbago, oil paint, or zinc. Farmers find it profitable to coat the bright surface of their plows and other implements with varnish, oil, or paint as soon as the season is over to prevent them from rusting. Rust may be removed from the surface by rubbing with an oiled rag or emery paper.

RUTH, Book of, a book of the Old Testament, which is generally placed immediately after the Book of Judges. It gives an account of Ruth, a Moabitess, who was married to Chilion, son of the Hebrews Elimelech and After the death of Elimelech and Naomi. Chilion, Ruth accompanied Naomi to Bethlehem, where she went into the field as a gleaner, but later married her kinsman, the aged Boaz. She became the mother of Obed, and through him the great-grandmother of David and the ancestress of Jesus Christ. The Book of Ruth is canonical and comprises a beautiful idyllic composition.

RUTHENIANS (ru-the'ni-anz), or Russniaks, the name of a Slavic people who inhabit large parts of Galicia, Bukowina, and Hungary. This race of people is allied to the Russians in language and physical features. They are mostly peasants, belong to the Orthodox Greek Church, and are pro-Russian in sympathies. As a political force they have been a disturbing element in Austria-Hungary, where they number about 3,500,000, of whom about 300,000 are in Bukowina and 400,000 in Hungary. These people are sometimes called Red Russians and Little Russians.

RUTHERFORD (ruth'er-ferd), a borough

of New Jersey, in Bergen County, eight miles northwest of Jersey City. It is between the Passaic and the Hackensack rivers, on the Erie Railway, and is the residence of many New York business men. The manufactures include clothing, mirrors, cotton and linen goods, and machinery. Electric lighting, sewerage, and a public library are maintained. Population, 1905, 5,218; in 1910, 7,045.

RUTLAND (rut'land), a city in Vermont, county seat of Rutland County, sixty miles south of Burlington, on the Burlington and Rutland, the Delaware and Hudson, and other railroads. It is finely located on Otter Creek, near Killington Peak of the Green Mountains, and has a large trade in produce and merchandise. The noteworthy buildings include the county courthouse, the public library, the house of correction, the Memorial Hall, the opera house, the high school, and the Federal building. It has systems of waterworks and sanitary sewerage, brick and macadam pavements, and electric street railways. Among the manufactures are sugar evaporators, scales, lumber products, monuments, dairy supplies, buttons, hardware, and machinery. The vicinity was settled in 1770. Rutland was one of the State capitals from 1784 to 1804. Population, 1910, 13,546.

RUTLEDGE (rŭt'lĕj), Edward, statesman, born at Charleston, S. C., Nov. 23, 1749; died Jan. 23, 1800. He studied law at London, England, where he was called to the bar, and began a successful practice at Charleston in 1773. The following year he was elected to the First Continental Congress and two years later was a signer of the Declaration of Independence. In 1780 he was taken prisoner while commanding at the siege of Charleston and was detained at Saint Augustine for eleven months. He was elected to the United States Senate in 1794, where he was an influential worker, and four years later became Governor of South Carolina.

RUTLEDGE, John, brother of Edward Rutledge, born at Charleston, S. C., in 1739; died July 23, 1800. He studied law at London, England, and began the practice of that profession at Charleston in 1761. Four years later he took part in the Stamp Act congress at New York and was a member of Continental Congress from 1774 to 1775. He took part in drawing up the State constitution, was President of the State of South Carolina, and afterward served as Governor under the new constitution. During the Revolutionary War he was active in the field, serving under Greene until 1782. Soon after he was elected to Congress, where he opposed the abolition of the slave trade, and in 1789 became a justice of the Supreme Court. Washington appointed him chief justice of the Supreme Court in 1795, but he lost his reason and the Senate refused to confirm the appointment.

RUYSDAEL (rois'dal), Jacob, eminent

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landscape painter, born in Haarlem, Holland, about 1625; died there March 14, 1682. He first studied and practiced surgery, but later gave his entire time to painting, his earliest works of art bearing date in 1645. His paintings are remarkable for the precision with which objects from nature, such as foliage, animals, and floating clouds, are outlined. He is the originator of a style of composition and a remarkable plan for grouping trees and shrubs. Seven of his etchings are extant, but the number of paintings still in galleries is larger, several being in Berlin, Paris, and London.

RUYTER (rī'tēr), Michael Andriaenszoon, eminent admiral, born in Flushing, Holland, March 24, 1607; died April 29, 1676. He descended from a family in moderate circumstances and entered the naval service as cabin boy when only eleven years of age. attention to the duties of a seaman caused him to be promoted a captain in 1635, and he was made rear admiral in 1645. He served in the East Indies for some years, fought against the pirates off the northern coast of Algeria in 1647, and in 1652 commanded a squadron in the war against England. In 1653 he defeated Blake off Dover, and in 1666 commanded in conjunction with Van Tromp against the British fleet under Prince Rupert and the Duke of Albemarle, but the battle was not decisive. The following year he destroyed several English vessels on the Medway, and inflicted material damage at Rochester and Gravesend. When the war against Holland broke out, in 1671, he commanded against the allied fleet of France and England, but the results were indecisive. He was sent against the French in the Mediterranean in 1675, where he fought a desperate battle off the coast of Sicily, but died from the result of a wound. Ruyter ranks with the most eminent military men of Europe. His name has been commemorated by a splendid military monument at Amsterdam.

RYAN, Patrick John, Roman Catholic archbishop, born in Cloneyharp, Ireland, Feb. 20, 1831. After studying in Thurles and Dublin, he entered Carlow College, and was ordained deacon in 1853. He removed to Saint Louis, Mo., the same year, where he studied at Carondelet Seminary, and was made priest in 1854. Faithful and efficient service caused his promotion to the position of coadjutor archbishop of Saint Louis in 1872, and he was made archbishop of Philadelphia in 1884. In 1887 he went to Rome in the interest of a university at Washington. He published "What Catholics do Not Believe" and "The Causes of Modern Religious Skepticism." He died Feb. 11, 1911.

RYE, an important cereal plant. It is native to the Levant, but is cultivated extensively in temperate climates, especially in Western Europe. Rye is nearly allied to wheat, but its autritive qualities are less, being about as 64 to 71. It is hardier than wheat and is adapted to

poorer and lighter soils. In most sections of North America it may be pastured in the early stages of its growth, but this is not advisable in dry regions. It does not grow as far north as barley, but yields well in sections that are too

cold for wheat. In most cases it is sown in the fall and ripens early in the summer, somewhat earlier than wheat. The species are not numerous. Those cultivated most extensively are known as *spring* and winter rye, depending whether they are sown in the spring or in autumn.

Rye forms the breadstuff of a large number of people, especially in



Russia, Germany, Holland, Sweden, Norway, and Great Britain. It is used extensively in making whisky, especially *Hollands*, and the straw is valuable for stuffing mattresses and collars and for use in making brick, baskets, and hats. Both winter and spring rye is grown in the United States, where the annual production is 26,500,000 bushels. New York, Pennsylvania, Wisconsin, Iowa, Illinois, Missouri, Michigan, Minnesota, New Jersey and Kansas are among the leading rye-producing states. Ontario produces more than half of the rye grown in Canada, having an annual yield of about 1,250,000 bushels.

RYE-HOUSE PLOT, a conspiracy planned in England in 1683, by the Whig party, with the view of assassinating Charles II. and the Duke of York, afterwards James II. scheme was to be executed near a farm called Rye-house as the two returned from the Newmarket races, but they passed the vicinity of the intended attack earlier than was expected, thus frustrating the scheme. Soon after the plot was discovered and Lords Essex, William Russell, Algernon Sidney, and others were placed under arrest. The first mentioned committed suicide in the Tower and both Russell and Sidney were beheaded, though neither of the three were in any way connected with the plot. However, Lieutenant Colonel Walcot, one of the real contrivers of the plot, was apprehended and brought to the block for treason.

RYSWICK (rīz'wīk), or Rijswijk, a village of Holland, two miles southeast of The Hague. It is celebrated from the peace of Ryswick, which was concluded here on Sept. 20, 1697. This treaty ended the war waged by the allied armies of Germany, Holland, Spain, and England against Louis XIV. of France on account of the claim of the latter to the French throne, which was recognized by the treaty. France, Spain, Holland, and England signed the treaty on Sept. 20, and Germany sanctioned it on Oct. 30.



SABINE

S, the fifteenth consonant and nineteenth letter of the English alphabet, forming a sibilant and representing a hissing sound. The letter is derived from the original Indo-Germanic, but came to us from the Latin through the Greek sigma. It is made by placing the front of the tongue against the roof of the mouth above the front teeth, an opening being left just behind the tip, and then emitting the vocalized breath. S has two sounds, known as sharp or hard, and soft or sonant. The former is represented in this, thus, sin and the latter represents the sound of z, as in muse, music, wise. It is silent in some words, as in viscount, aisle, and island.

SAALE (zä'le), a river of Germany, which rises in the Fichtelgebirge, in Bavaria, and flows into the Elbe above Magdeburg. The length is 226 miles. It is navigable for 103 miles, having been improved by dredging and the construction of several locks.

SAAR (zär), a river in the southern part of Germany, rising in the Vosges Mountains, near the boundary of Alsace. It flows northwest through Lorraine and the Rhine Province, discharging into the Moselle a short distance above Treves. The Saar is 152 miles long. It is navigable to Saarbrücken, a distance of 54 miles. The construction of a system of locks has made it possible for steamers to ascend to Saargemünd

SAARBRÜCKEN (zär-brük'en), a city of Germany, in the Prussian Rhine Province, on the Saar River, 48 miles northeast of Metz. It is surrounded by a coal-mining region. The features include an old castle, the city hall, the gymnasium, electric street railways, and a statue of Bismarck. Among the manufactures are leather, hardware, tin, Berlin blue, tapestry, machinery, and linen fabrics. The municipality has extensive systems of waterworks and sanitary sewerage. Saarbrücken was made a part of Prussia in 1815. It was captured by the French in 1870, but they were compelled to abandon it after a few days. Population, 1915, 26,944.

SABBATH (săb'bath), the seventh day of the week, appointed by the Mosaic law for cessation from labor and the worship of God. It was set apart to commemorate the event that

God created the world in six days and rested on the seventh. Keeping holy the Sabbath is enjoined by the Fourth Commandment in Exodus, because of God's having rested after the creation, and in Deuteronomy its observance is demanded because of the deliverance of the Hebrews from Egyptian bondage. Any mention of the Sabbath in the New Testament implies the seventh day of the week, but the Christian fathers in general drew a distinction between the Sabbath and the Sunday as early as the first three centuries. They regarded the Jewish Sabbath as obsolete and looked upon Sunday as the divinely instituted Lord's Day, joyous in its character, making memorable the resurrection of Christ. The Council of Laodicea, in 366, made it plain that Christians

are to observe Sunday.

The name Sabbath is used by most Christians to designate the Lord's day, or Sunday, though Jewish writings and those of Adventists and other Christian sects making use of the name imply that Saturday, or the Sabbath, is meant. The Sabbath was observed with great rigidity in the time of Christ. At that time Jews were not allowed to go from their city a distance greater than 2,000 cubits, about a mile, which came to be called a Sabbath-day's journey. Thus, every seventh day was one of rest, while every seventh year was known as the Sabbatical year, in which the lands were not cultivated and the crops and fruits produced became the property of all in common. When the Pharisees denounced Christ as a Sabbath breaker because he rendered service to mankind, he replied: "The Sabbath was made for man, and not man for the Sabbath: therefore the Son of Man is Lord also of the Sabbath.'

SABINE (sà-bēn'), a river of the United States, which rises in northeastern Texas and, after a course of 500 miles toward the southeast and south, flows into the Gulf of Mexico. It enters the gulf through Sabine Pass, a bay about eighteen miles long and eight miles wide. The Sabine River forms the principal part of the boundary between Texas and Louisiana. It is a shallow stream and is navigable only for small vessels.

SABINES (sā'bīnz), or Sabini, a people of ancient Italy, who occupied a large part of northeastern and middle Italy. Amiternum was their capital and occupied a place near the present town of Aquila. The Sabines were closely allied to the Latins. They were an important nation before Rome was founded and it is thought that they occupied the Quirinal Hill, while Romulus built Rome on the Palatine Hill. The Sabines ceased to exist as an independent nation in 290 B. c., when the Romans incorporated them as a part of Rome. History contains many evidences that the population of Rome included an important Sabine element and that its influences became intermixed with those of Latin origin, both in religious rites and civil institutions. No remains of the Sabine language in the form of inscriptions have been discovered, but coins issued in Rome at an early period give evidence that the Sabine language had a notable influence upon that of the Romans.

SABLE, a flesh-eating mammal of the weasel family. It is about the size of the pine marten, to which it is closely related. The color is brownish in summer, but turns much darker in winter, in which condition the fur is highly esteemed as an article of commerce. The value of a single skin ranges from \$25 to \$75, depending on the fineness and color. In summer the skin is less valuable, owing to the fact that it is characterized more or less with white spots on the head and grayish markings on the neck. The sable is native to the northern part of Europe and Asia. It lives principally in trees, hunting by night and lying concealed during the day. The pakan of North America is frequently called the Hudson Bay sable and its skin is sometimes used to imitate that of the true Russian sable.

SABLE ISLAND, an island in the Atlantic, situated 110 miles east of Nova Scotia. It has a low and sandy surface, is about 25 miles long, and has a breadth of one to five miles. The island is under the government of Nova Scotia. It has two lighthouses and a hospital for shipwrecked persons. Many disastrous accidents at sea occur in the vicinity. Valuable fisheries prevail. Vegetation consists chiefly of grasses, peas, potatoes, strawberries, and cranberries.

SAC, or Sauk. See Sacs and Foxes.

SACCHARIN (săk'kâ-rīn), a white crystalline compound derived from coal tar. It was discovered at Johns Hopkins University by Ira Remsen and Charles Fahlberg in 1879. Saccharin is soluble in hot water, ether, and alcohol, and melts at 220°. It is 300 times sweeter than cane sugar, one grain being perceptible in 10,000 grains of distilled water. Manufacturers of confectionery use it to a considerable extent, especially in Germany, and it is also employed in brewing. It is recommended in some diseases, as diabetes, though it is not considered a food. The name saccharin in an extended sense is applied to any substance having the quality of sugar, such as honey, cane sugar, glucose, and other saccharin compounds.

SACHS (zäks), Hans, noted poet, born in Nuremberg, Germany, Nov. 5, 1494; died Jan. 19, 1576. He learned the trade of a cobbler and spent the usual number of years in journeyman wandering, or Wanderjahre. In the meantime he was instructed in singing by a Meistersinger named Lienhart Nunenbeck. Much of his poetic work was done at Munich. His writings include about 6,000 poems, but only about one-fourth are extant. print comprise 53 sacred plays, 59 fables, and 64 farces. Many of his hymns were used extensively in promoting the spiritual feeling in the Reformation. A collection of his works was published in 1872. Two years later a monument was erected to his memory in Nuremberg.

SACKETT'S HARBOR (săk'ets), a village of New York, in Jefferson County, on Black River Bay, eight miles east of Lake Ontario. It is situated at the mouth of the Black River, has a good natural harbor, and is a port of entry. Communication is furnished by steamers and by the New York Central Railroad. The features include the Federal military post, the Madison Barracks, the high school, and Fort Topkins Park. In the War of 1812 it was important as a port and for the building of the frigates Superior and Madison. The British made two attacks upon the place, but they were defeated with a loss of 150 men. Population, 1905, 1,398; in 1910, 868.

SACKVILLE, Thomas, statesman and author, born at Buckhurst, England, in 1536; died April 19, 1608. He studied law at the Inner Temple and was called to the bar. Soon after he joined Thomas Norton in writing the tragedy "Ferrex and Porrex," which was afterward called "Gorbobuc." This was the first English tragedy to be written in blank verse and was performed at the Inner Temple on Twelfth Night. In 1566 he was made Lord Buckhurst and soon after went to France as a minister. He became Lord Treasurer of England in 1599. James I. created him Earl of Dorset. Sackville sat as a member of the court that tried Mary. Queen of Scots, and presided at the trial of the Earl of Essex. He was buried in Westminster Abbey.

SACO (sa'kô), a river of New England, which rises in the White Mountains of New Hampshire and flows toward the southeast through Maine. The main branch passes through the noted Crawford Notch of the White Mountains. A number of falls and cataracts in its course afford valuable water power. The falls include one of 42 feet at Saco and one of 72 feet at Hiram. The entire length is 160 miles, but it is navigable only to Saco, which is the head of tide water and of navigation by large vessels.

SACO, a city of Maine, in York County, on

the Saco River, twenty miles southwest of Portland, on the Boston and Maine Railroad. The river is crossed within the city by four bridges and supplies water power for industrial purposes. The noteworthy features include the Dyer Library, the Thornton Academy, the York Institute Library, the high school, and Pepperel Park. Among the manufactures are cotton and woolen goods, boots and shoes, lumber products, and machinery. Old Orchard Beach is a popular summer resort, about three miles from Saco. Saco was settled in 1631 and was first incorporated as Pepperelboro, but was chartered under its present name in 1867. Popula-

tion, 1900, 6,122; in 1910, 6,583,

SACRAMENT (săk'ra-ment), the name of certain religious rites in the Christian Church. The term was used by the early writers to denote any mysterious thing or doctrine, but later it became restricted to particular rites, which are believed by some churches to impart to Christians who use them an invisible grace. The Greek, the Armenian, and the Roman Catholic churches hold to the seven sacraments of baptism, confirmation, the eucharist, penance, extreme unction, orders, and marriage. Protestants generally believe only in two sacraments, those of baptism and the Lord's supper, on the ground that the New Testament mentions only these two as having been instituted by Christ. Luther and Melanchthon accepted these and inclined toward adding penance as a sacrament. While the Friends reject the doctrine of the sacraments, the Mennonites and Dunkers coordinate washing of the feet as an obligatory ordinance, which they administer with baptism and the Lord's supper.

SACRAMENTO (săk-rà-měn'tô), the largest river in California, which has its source in the northeastern part of the State, where it is called the Pitt River for some distance. The general upper course is toward the southwest, but at Redding it assumes a southerly course. After receiving from the east the Feather River and joining the San Joaquin, it flows into the Pacific Ocean through San Pablo and San Francisco bays. The entire length is 600 miles, including the Pitt River, and about one-half is navigable for small boats, but steamers of large size ascend as far as Sacramento, about 50

miles.

SACRAMENTO, the capital of California, county seat of Sacramento County, 90 miles northeast of San Francisco. It is finely located on the Sacramento River, which is spanned by a bridge, and has transportation facilities by the Southern Pacific and the Central Pacific railways. The streets are regularly platted, crossing each other at right angles, and many of them are paved and lighted with gas and electricity. In the central part of the city is a fine public park, which contains the State capitol, completed in 1869 at a cost of \$2,500,000. Within the park are beautiful flower beds, spa-

cious walks, and many rare species of shrubs and trees. Other buildings of note include the county courthouse, the post office, the city hall, the Crocker Art Gallery, and several fine bank and office buildings.

Sacramento has a well-organized system of public schools. It is the seat of the Howe's Academy, the Saint Joseph's Academy, and the Christian Brothers' College. The public library contains 30,500 volumes, while the State library has 113,500 volumes. Among the benevolent and charitable institutions are the Protestant Orphan Asylum, the Southern Pacific Hospital, the Marguerite Home for Aged Women, and the City Dispensary. The Roman Catholic cathedral is a fine ecclesiastical structure. Fairs are held annually under the State Agricultural Society, which maintains fine grounds and buildings. It has extensive systems of sanitary sewerage and public waterworks.

The city is located in a fertile farming and fruit-growing region, hence has a large trade in produce and merchandise. The manufactures include flour, saddlery, spirituous liquors, furniture, carriages and wagons, and machinery. The shops of the Southern Pacific Railway employ a large number of workmen and machinists. Communication within the city and to many interurban points is facilitated by electric rail-

ways

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The first settlement was made in 1839, when Captain J. A. Sutter built a small fort and named it New Helvetia. Miners and prospectors began to reach the place in 1848, when the name was changed to Sacramento. Floods caused much damage in 1850 and in 1853, but levees have been constructed and the land has been raised to avert such dangers. In 1854 it became the State capital and it was chartered as a city in 1863. Its rapid growth dates from 1854, when the first railroad was completed into the city. Population, 1900, 29,282; in 1910, 44,696.

SACRIFICE (săk'rĭ-fīz), an offering to God, either as a thanksgiving or an atonement. practice of offering sacrifices has prevailed from remote antiquity and it is not certain how it originated. Some writers contend that it was instituted by God, while others think that it originated in the desire of man to approach the Deity. Some classes look upon sacrifices as a compensation to the gods, hence they contend that their efficacy depends more or less upon the value of the offering, or upon the exertion required by the individual to attain and offer the sacrifice. The offering of a thing of value, as gold or silver, was not looked upon as being of greater efficacy than a blood offering, such as a slaughtered animal, since the latter represented both value and human exertion.

Peace offerings consisted usually of one or more animals, certain parts of which were burnt upon the altar, while the remainder was given to the priest to be eaten by him and his family. Others consisted of those known as sin offerings,

which included sacrifices of various kinds for the remittance of sins. Among the Jews it was customary to offer the Passover lamb in memory of the deliverance from Egypt. The book of Leviticus details the custom of offering sacrifices among the Hebrews. However, this practice extended to the Greeks, Romans, Brahmans, Mexicans, and practically to all primitive and ancient peoples. In many countries it was customary to offer human sacrifices, but in most instances the blood sacrifices were confined to the offer of animals.

SACS AND FOXES, the names of two tribes of American Indians which are closely associated in history. They are of the Algonquin family. The Sacs settled near Green Bay, Wis., on account of being pressed westward by the Iroquois, where they were joined subsequently by the Foxes. Both tribes were courageous as warriors and were noted as enemies of the French. They assisted the English in most of their wars. In 1712 they made an attack upon Detroit, but were compelled to retreat to Lake Saint Clair, where they met defeat. Later they served under Pontiac and during the Revolution supported the English. The Rock River Sacs aided Great Britain in 1812 and the Foxes aided the English in attacking Sandusky.

The Sacs ceded their land in 1816 and became wholly identified with the Foxes, who ceded lands in 1824 and in 1830. In 1832 they fought under Blackhawk to recover a part of their lands, but gave up more of their territory in a treaty with General Scott at the close of the Blackhawk War. Later they removed to central Iowa, and in 1842 most of them were removed to the Osage Reservation, now Oklahoma. A party of 325 Sacs and Foxes purchased land at Tama, Iowa, in 1857, which they still occupy and manage with marked industry and intelligence. Settlements of Sacs and Foxes are also in Kansas, Nebraska, and Oklahoma. The two tribes number about 1,000, many of whom are among the most industrious and successful of their race.

SADDLERY (săd'dlēr-y), the general name applied to saddles and harnesses, such as are offered for sale in a saddler's shop. Saddles were in common use among the Egyptians, but they were a part of the draught harness of the animal that bore the load, instead of being a seat upon the back for the rider. The ancients used a form of saddle or box for the back of the camel, which served both for riding and to contain merchandise and other commodities. Saddles were first padded, but trees came into use in Rome about the 4th century A. D., and stirrups began to be used in the 7th century. Sidesaddles date from the 12th century and are used largely by women.

Both saddles and harnesses have differed very materially under a variety of circumstances and in different countries. Among the principal parts of a saddle are the tree, the seat, the pom-

mel, the skirts, the stirruts, and the girth. Among the essentials of a modern harness are the bridle, either with or without blinders; the collar, which fits about the neck and shoulders; the hames, which fit to the collar; the tugs, forming the attachment between the hames and the load; and the saddle, which holds the lines, tugs, and reins in place. Harnesses are either single or double, depending whether they are to be used for a single horse or a team.

SADDUCEES (săd'û-sēz), the name of one of the chief Jewish parties or sects, the other being the Pharisees. They rose among the Jews in the 2d century before Christ, taking their name from Zadok, a priest who declared in favor of Solomon. It is certain that they did not become a party as early as the time of Zadok, but it is thought that the early representatives were his descendants. All of them admired his fidelity to the theocratic government and, like all other Jews, admitted that the Mosaic law was given at Sinai by Jehovah in person. The Sadducees rejected the belief that an oral law of Moses had come from God, and would accept nothing beyond the written word, hence they came to hold three particular doctrines.

The principal doctrines of the Sadducees include the belief that all the law of God was given in a written form to Moses, that there is no resurrection of the dead with attendant rewards and punishments in the future world, and that there are neither angels nor spirits. Less numerous than the Pharisees, they included the more wealthy and aristocratic, and at one time almost monopolized the more honored places in the priesthood and the highest dignities. There was a marked decrease in their number in the 1st century, but a revival of their views took place later, and their position is now represented by the Karaites. Most of the information regarding the Sadducees is drawn from Josephus and the New Testament.

SADI (så-de'), the name assumed by Sheikh Muslih-ud-din, a celebrated didactic poet of Persia, born at Shiraz about 1184; died there in 1263. He descended from Ali, son-in-law of Mohammed, but little is known of his early history. After studying science and theology at Bagdad, he made a pilgrimage to Mecca, and soon after traveled extensively in Palestine, Syria, Hindustan, Egypt, and Eastern Europe. The Crusaders made him a prisoner and required him to work as a slave on the Tripolitan fortifications, but he was recognized by an Aleppo merchant, who ransomed him. Fully fifty years of his life were spent in traveling, in the course of which he made fourteen pilgrimages to Mecca, but in the later part of his life he settled in his native town. Sadi not only delighted the people of his time by his writings in prose and verse, but with numerous sage precepts, which he was able to give in many different languages. His "Gulistan," or "Garden of Flowers," is counted his best writing, being a work in prose and verse that comprises anecdotes, stories, and numerous observations and reflections on morality. "Bustan," or "Tree Garden," is a collection of fables and histories, and "Pand-Nameh," or "Book of Instructions," is an elegant treatise on the duty of culture. It contains many maxims.

SADOWA (sä'dō-vā), a village in Bohemia, on the Bistritz River, near Königgrätz. It is important as the scene of a decisive battle on July 3, 1866, in the Austro-Prussian War. The Austrian army of 220,000 was commanded by General Benedek and the Prussian of 240,000, by King William I. The terrific battle raged from 8 A. M. to 4 P. M., resulting in the defeat of the Austrians with a loss of 21,000 men and 22,000 prisoners, while the Prussians lost only 9,000. This battle is sometimes called Königgrätz, since the village of Sadowa is about eight miles distant.

SAFE, an iron or iron and steel receptacle for protecting valuables against burglars and fire. Documents and possessions of value were protected in ancient times by placing them in iron-bound oaken chests and in the charter rooms of old mansions, but these have given way to fire- and burglar-proof safes of modern construction. The first patent on a fireproof safe was issued in 1801. Subsequently they were greatly improved, both in size and in the style of manufacture, and they are now in almost universal use among business men and others in civilized countries. Safes are commonly made with double-plated sides, the space between being filled with a nonconductor of heat, such as fire clay and chalk, or plaster of Paris and alum. Some manufacturers pack a number of small tubes filled with an alkaline solution in the space between the two parts, these being hermetically sealed, and in case the safe becomes overheated the tubes burst and aid in saving the contents by saturating them.

To be of service for all purposes, a safe must be heavy enough to be proof against being carried away, while the lock and the material used in its construction must contain the elements necessary to prevent burglars from forcing an The most secure entrance to secure the contents. safes have keyless time locks, which are so constructed that the owner may set a mechanical contrivance in the form of a clock, thereby making it impossible to open the safe at any other time than that intended by the person setting the time lock. Electrical arrangements are provided in some cases to give signals in case there is an unlawful interference, and these are attached to the safes in such a manner that they may not be easily seen by intruders. Experience has demonstrated that it is much easier to render a safe fireproof than to make it proof against burglars. Safes are made of any size to meet the needs of those wanting small or large accommodations in the way of space to receive deposits.

Safe-deposit companies are corporations that receive and keep money, stocks, jewelry, bullion, and other valuable property for depositors. This is an American enterprise, the first company being chartered in New York in 1861, but now there are safe-deposit companies in all the large cities of the world. These companies provide strong, fireproof vaults, which they construct of steel and iron plates welded together, and surround them with strong masonry, thus making them absolutely proof against thieves and fire. Tiers of safes and deposit boxes of all sizes are placed in the interior, making it possible to accommodate patrons with the size and kind of storeroom wanted. The vaults are guarded by armed watchmen both day and night, and a careful record is kept of each depositor. A person renting a safe or box is described minutely in a record book. He receives a private password and is supplied with the only key or keys that fit the lock of the box or safe rented, each being supplied with a different lock. Safedeposit companies have been the means of saving many thousand dollars' worth of valuable papers and property in cases of fire, and in supplying protection for the valuables of residents and travelers.

SAFETY LAMP, a device for giving light in mines. It is constructed so the flame does not cause an explosion in cases where fire damp prevails. Marsh gas is often freed in many coal mines by cutting into seams and, when mixed with a quantity of air, it assumes a highly explosive form. Besides the danger incident to the explosion, there is further danger from choke damp after the explosion has occurred. for the reason that an explosion always renders a large bulk of air unfit to support life. Sir Humphry Davy, in 1816, invented the first safety lamp, but it has been materially improved upon within recent years. The Davy lamp depends upon the principle that flame does not pass through fine network of wire or gauze and that light does. It is constructed of a cistern to hold the oil, and the wick, issuing from a tube at the top, is covered and fully surrounded by wire gauze. The wires are usually not over one-fiftieth of an inch in diameter, and the apertures must not exceed one-twenty-second of a square inch. When constructed on that plan, the air passes through the apertures, even when charged with fire damp.

An improvement on the Davy lamp consists of a glass cylinder placed inside the wire gauze, thereby guarding against air currents and insuring a more uniform light. There is a perceptible increase in the size of the flame when the lighted lamp comes in contact with the atmosphere mixed with fire damp, and the miner is thereby warned that danger is at hand. Reasonable safety is insured as long as the lamp is in good condition, but it has been found that it is not an absolute protection against danger. The newer safety lamps are self-extinguishing when

brought into an explosive mixture of air and fire damp. However, the most secure devices of this kind yet devised are the miners' lamps which employ electricity.

SAFETY VALVE, a valve, usually circular in form, which is used on steam boilers to furnish protection against taxing them beyond their strength. Such a valve is kept in place either by a spring or by a weight, and is located at the side or in the top of a steam boiler. Most stationary engines have one valve of this kind, while locomotives are supplied with two. The valve is gauged at a certain point, depending upon the strength of the boiler or the pressure desired, and the steam escapes whenever the pressure exceeds the weight with which the valve is held. After the valve has been forced upward and the pressure on the boiler is relieved, it assumes its former place. The standard for determining the size of the safety valve is the grate surface, which should not exceed two square feet of surface in the boiler to one square inch in the safety valve. Care should be exercised so the valve is not fastened or loaded too heavily as compared to the strength of the

SAFFLOWER (săf'flou-er), an annual plant of the Compositae family. It has an erect cylindrical stem from one to two feet high, spiny leaves, and compact heads of flowers of a deep orange color. The stem is inclined to branch considerably. It is native to India, but has been naturalized in Egypt and the southern part of Europe, where it is cultivated extensively. The safflower is used principally as a dye and for making rouge. The seed yields an oil used extensively by the Asiatics as a laxative in medicine and as a lamp oil. Dyes obtained from this plant are derived from the leaves, which are picked by hand in dry weather and dried in a kiln. Both red and yellow coloring materials are obtained, but they are not valued highly for dyeing. However, the safflower is of economic value in making rouge, which receives its color from the coloring properties of this plant.

SAFFRON (săf'frun), an autumn flowering species of crocus. It is often called the autumnal crocus to distinguish it from a species called spring crocus, which it closely resembles. The flowers of the plant yield the saffron of the market, which is now used largely for coloring confectionery, liquors, medicine, and foodstuffs. It requires about 4,000 flowers to make an ounce of saffron. Formerly saffron was used as a dye material, for perfume, and as a medicine, but it has gone out of use for those purposes, except in parts of Asia. The saffron plant is cultivated extensively for its flowers in France, Spain, Italy, and the western part of Asia.

SAGA (sā'gà), meaning a tale, the name used to designate a form of literature common to the ancient Scandinavians, particularly those of Iceland. The sagas include many volumes of writings that date from the 12th and the three following centuries. They embrace history, poetry, legends, and writings that blend fiction with authentic narratives. Prior to the 12th century they passed from generation to generation without being committed to writing, hence the mythical and fabulous circumstances connected with many of them are accounted for. The word has the same meaning as the German



1. SAFFLOWER. 2. SAFFRON.

word Sage, and German writers have applied the term to the legendary and traditional literature of their own and other countries. Thus, the Firthjofs-Saga is attributed to the Norsemen, the Ingvars-Saga to the Swedes, the Eymunds-Saga to the Russians, and the

Knytlinga-Saga to the Danes.

SAGASTA (sa-gas'ta), Praxedes Mateo, statesman, born at Torrecilla de Cameros, Spain, July 21, 1827; died Jan. 5, 1903. He was educated at the School of Engineers in Madrid and in 1854 became a member of the constituent Cortes, but took part in the insurrection of 1856 and was obliged to flee to France. A general amnesty proclaimed soon after permitted him to return to Spain, when he became professor of the School of Engineers in Madrid and edited La Iberia, the principal organ of the progressist party. In 1866 he took part in another insurrection and fled to France, and did not return until the death of Queen Isabella. He avowed his belief in a monarchical government for Spain in 1870, became minister of state the same year, and was successively minister of the interior, president of the council, and minister of foreign affairs. In 1875 he became the leader of the liberal party. He caused the Castillo ministry to be overthrown in 1881 and was made prime minister. He was succeeded in the ministry by José Posado Herrera in 1883, but again became minister after the death of King Alfonso XII. In 1890 he retired, but was chosen minister in 1893, serving until 1895. The steady decline of Spanish influence in Cuba and the Philippines caused him to be called by the queen regent to form a new cabinet, serving as prime minister throughout the Spanish-American War. When the Treaty of Paris, that required Spain to give up its principal colonies, was submitted to the Cortes for ratification, Senor Sagasta and his cabinet supported its ratification, but a resignation followed on account of a majority of only two votes being polled against a counter measure. Sagasta was one of the leading statesmen in the recent history of Spain.

SAGE, an extensive genus of plants of the mint family, which are widely distributed in warm regions, embracing 450 species. Most of these plants are perennials of a shrubby nature. They have greenish gray leaves, yield bluish flowers, and grow to a height of about two feet. The garden sage, native to the southeastern part of Europe, is the best known. It is used extensively for flavoring meat, especially for dressing in poultry, and the leaves are employed in making a slightly stimulating tea. The apple-bearing sage is native to Crete, where the gallnuts are used in flavoring confectionery.

SAGE, Russell, capitalist, born in Oneida County, New York, Aug. 4, 1816; died July 22, 1906. After attending the public schools, he en-



RUSSELL SAGE.

gaged in business at Troy, but later removed to New York City, where he acquired a fortune by investing in railroad stocks. He promoted various telegraph and cable companies, and was an investor in the elevated railroad of New York City. In 1853 he was elected to Congress as a Whig and was reëlected in

An attempt was made to assassinate him in 1891 by means of a dynamite bomb, but he escaped uninjured, while W. R. Laidlaw, one of his clerks, received severe injury. The latter sued him for damages in 1895 and was awarded \$40,000. His vast estate was left to his wife, Margaret Slocum Sage, at the time of his death. The latter became famous as one of the most noted philanthropists of America. She established the Sage Foundation of \$10,000,000, in 1907, to improve the social and living conditions in the United States. Subsequently she made liberal gifts to the Pascal Institute, Berea College, Princeton University, and other institutions.

SAGE GROUSE, the name of a species of grouse native to North America, so named from its habit of feeding upon the sagebrush. The legs and feet are feathered to the toes, the tail is elongated, and the feathers have a brownishyellow color. The male is larger than the female and has naked air sacs on each side of the neck. An average cock is about 30 inches long, while the hen ranges from 20 to 24 inches in length. The flesh is highly esteemed as food, but it is frequently tainted by a bitter flavor from the sagebrush, especially if the bird is not drawn as soon as shot. The sage grouse is found on the plains from British America to the northern part of Mexico, but is most abundant in the

sagebrush region.

SAGHALIEN (sä-kà-lyēn'), or Sakhalin, an island off the eastern coast of Asia, located north of Yezo and separated from the mainland by the Gulf of Tartary. It lies in the Sea of Okhotsk and between it and Yezo is the Strait of Perouse. In the northern part is the Gulf of Amur; east of it, the Bay of Patience; and south of it, the Gulf of Aniva. It is 670 miles long and from 15 to 80 miles wide. The area is 27,500 square miles. The surface is mountainous, with elevation ranging from 3,500 to 5,000 feet, but the coasts are generally fertile. Owing to its extent from north to south, it has a considerable difference in climate. Cold currents from the Sea of Okhotsk affect it noticeably, hence the eastern coast is somewhat colder than the western, which is influenced by the warm currents of the Sea of Japan. The winters are very severe, but the summers are warm. A snowfall of seven feet during the winter is not uncommon and rains are correspondingly abundant.

Saghalien has valuable forests, consisting chiefly of coniferous trees. Fishing is an important occupation, both in the streams and off the coast. Agriculture, coal mining, and lumbering are the principal occupations. The inhabitants consist largely of Ainu stock, but a considerable number are Russian. Fishing is largely in the hands of the Japanese and Chinese. The island was discovered in the 17th century by Gerrit de Bries, a Dutch navigator. It was claimed by Russia as a part of Siberia and became a Russian penal colony in 1869. However, Japan claimed the southern part of the island until 1875, when it was released in exchange for a part of the Kurile Islands. By the Treaty of Portsmouth, which terminated the Russo-Japanese War, in 1905, the southern half was ceded to Japan. The total population of the island is 29,875.

SAGINAW (săg'i-na), a city in Michigan, county seat of Saginaw County, on the Saginaw River, 98 miles northwest of Detroit. It is on the Grand Trunk, the Père Marquette, and the Michigan Central railroads. The largest vessels that ply on the lake are able to reach the harbor. Four railroad and five public bridges span the river. The area of the city is about fifteen square miles. It has brick and asphalt pavements, electric street railways, public waterworks, and Hoyt and Riverside parks. The noteworthy buildings include the county courthouse, the Hoyt Library, the Germania Institute, the Federal post office, the Arbiter Hall, the Masonic Temple, the Saint Mary's Hospital, the Saint Vincent's Orphan Home, and the Saginaw Valley Medical College.

Saginaw is important as an industrial and

wholesaling center. Among the manufactures are lumber products, flour, furniture, sailing vessels, salt, tobacco products, engines, and machinery. In the vicinity are extensive deposits of salt and bituminous coal, large quantities of which are mined. The town was platted in 1836 and the first charter was granted in 1831. Formerly there were two cities, known as Saginaw and East Saginaw, but they were united by an act of the Legislature in 1890. Population, 1904, 46,610; in 1910, 50,510.

SAGINAW BAY, an inlet from Lake Huron into the State of Michigan, forming the largest and most important bay of the Southern Peninsula. It is sixty miles long and thirty miles wide. Saginaw Bay has several fine harbors and valuable fisheries. It receives the water from the Saginaw River, a stream formed by the Shiawassee and Flint rivers. The Saginaw River is 30 miles long and is navigable for 24 miles by steamers drawing ten feet of water. Its principal tributaries are the Chippewa and Cass rivers.

SAGITTARIUS (săj-ĭt-tā'rĭ-ŭs), the sign of the zodiac into which the sun enters about Nov. 22. It is so named from the archer and is the ninth of the twelve zodiacal signs. The name is also applied to a constellation, the *Sagittarius*, which corresponds to the sign Capricornus.

SAGO (sā'gō), an article of food obtained from the inner portion of the bark of several species of palm trees. The sago-bearing palms



SAGO PALM AND FRUIT.

thrive in the East and West Indies, the Bahamas, and New Guinea. They attain a height of from 20 to 35 feet and a diameter of about 20 inches. The trees are cut down at maturity to secure the medullary or inner part, which weighs from 150 to 700 pounds. It is reduced to powder and by a process of treatment is formed into grains about the size of coriander seeds, or is ground into a whitish powder called sago meal. The principal constituents are protein, 9 per cent.; water, 12 per cent.; and nitrogen-free extract (mostly starch), 78 per cent. In the countries where sago is produced it is used ex-

tensively as a staple food. Elsewhere it is eaten mainly as a delicate article of diet. It is also employed as a starch for textile fabrics, in adulterating arrowroot, and as an essential ingredient for making soluble cocoas.

SAGUENAY (săg-e-nā'), a river of Canada, in the province of Quebec. It is the outlet of Lake Saint John, but has its source mainly in the Chamouchouan River and other streams that rise 150 miles northwest of the lake. Below the lake it has a length of 130 miles, flowing into the Saint Lawrence about 115 miles below Quebec. Many rapids are in the upper course and a large part is characterized by fine scenery and precipitous cliffs. The town of Tadousac, at the mouth, is noted as a summer resort. It is navigable to Ha Ha Bay for the largest steamers.

SAGUNTUM, or Saguntus, anciently an important city of Spain, near the Ebro, on the Canales River, three miles from the Mediterranean. The city was founded by Greek traders, under whose influence it rose to wealth and commercial importance, but is noted in history more particularly for the siege and battle fought here by the Carthaginians under Hannibal in 219 B.C. The siege extended over a period of about one year against an army of 150,000 men. After being sorely pressed by a famine, the city made a most heroic effort to repel the besieging army, but its army was utterly routed and the city was destroyed. This battle was the direct cause of the Second Punic War. The site of Saguntum is now occupied by the town of Murviedro. Near it are the remains of a theater and the ruins of a temple of Bacchus.

SAHARA (sa-ha'ra), the extensive desert of North Africa, embracing the largest unproductive region in the world. It may be said to extend east and west from the Atlantic to the Nile, and from the interior of the Sudan northward to the interior of Tripoli, Algeria, and Morocco, but there are deserts of more or less extent penetrating from it in various directions. The entire area included in the desert is estimated at 3,565,565 square miles, or a region nearly as large as all of Europe. Its surface is constituted of formations differing vastly in composition, and ranges in altitude from 100 feet below to 8,000 feet above sea level. It may be said to comprise a vast undulating expanse, being formed mainly of ranges of hills, dry water courses, evaporated lake beds, extensive sand tracts, and here and there oases bearing a variety of vegetable forms. In the northern part are ranges of mountains extending southward from the chains of the Atlas in Morocco and Algeria, where also are the tracts known as the Gidi and Areg deserts. The most extensive tracts of level surface are in the interior and southern parts, where the sand often drifts very much like snow in a storm, with the difference that it is much more unpleasant and sometimes extremely dangerous. A large part of Egypt

and Abyssinia are included in the Libyan desert, which extends westward beyond 20° east of Greenwich.

It was formerly supposed that the Sahara lies almost exclusively below the level of the sea, and that interior Africa could be redeemed for cultivation by conducting the water from the ocean through a vast canal to supply a water surface sufficient for the formation of clouds that would distribute rain in abundance. This view has been disposed of by recent explorations, but it is reasonably certain that low-lying districts between Morocco and the Senegal River, now belonging to Spain, could be redeemed by admitting water from the Atlantic. Many species of wild animals are abundant in the Sahara, among them the hyena, antelope, mountain sheep, baboon, tortoise, ostrich, lion, and many others, all of which find an abundance of material for subsistence in the oases or on the desert tracts producing at least scant supplies of vegetation. Serpents, jerboas, lizards, and allied forms of life are quite common in the regions of burning sands, where a variety of herbage prevails that subsists with little moisture. In the region of great heat and moving sands, as the Gidi Desert, extending through the expanse south of Morocco nearly parallel to the Atlas Mountains, the most characteristic features of the desert are found, such as total absence of water and vegetation, and the presence of intense heat and strong wind.

The Sahara Desert is crossed and traversed exclusively by caravans, though railroads have been built across short expanses projecting from the desert proper, particularly in the Nile basin and Algeria, and the French have projected a line to run through the regions tributary to the Upper Senegal and Niger rivers. An advantage is found in traveling from oasis to oasis in caravans, because an organized company can better supply itself with the necessary means of subsistence, such as water and food, for long journeys. Besides, these organized companies have greater assurance of overcoming the danger attending the hot winds, or simooms, and attacks by hostile natives. Many of the oases are well watered and, by reason of great fertility, support a considerable trade and, in many cases, one or more towns. The moisture common to oases comes largely from springs and subterranean water courses, but in southern Algeria and elsewhere the productive area has been greatly enlarged by artesian wells, the depth ranging from 10 to 400 feet.

It is estimated that the Sahara has a population of about 2,500,000, which is made up largely of Berbers, Arabs, and Negroes. The inhabitants subsist mainly by the cultivation of cereals and fruits and the rearing of camels and sheep. In some regions they conduct a considerable trade with the caravans that move periodically through the different sections. The most important caravan routes extend from the northern

part of the Sudan to the Nile and the seaports of the Mediterranean. Valuable mineral deposits are abundant, especially salt, which is derived largely from the vicinity of Lake Kaffra. Deposits of granite, iron, limestone, and many metals are abundant, but these are practically undeveloped. Salt is produced quite extensively and is transported to ports on the Mediterranean, or is conveyed by caravans and the Niger River to the Atlantic ports.

SAIGON (sī-gōn'), or Saigun, the capital of French Cochin China, on the Saigon River, near where the stream enters the South China Sea. It is one of the most important river ports of Southern Asia. Saigon has convenient railroad facilities and canal connections with Mekong. It has a large interior trade in cereals and fruits. A vast commerce is maintained with China and the East Indies, principally in rice. Among the manufactures are earthenware, sailing vessels, clothing, lumber products, tobacco

Among the manufactures are earthenware, sailing vessels, clothing, lumber products, tobacco and cigars, textiles, and machinery. It is strongly fortified and contains a number of important government buildings, hospitals, temples, and educational institutions. Since 1862 it has belonged to France. Population, 1917, 62,526.

SAIL, a class of canvas cloth used to attach

SAIL, a class of canvas cloth used to attach to a mast or stay on a vessel. The purpose is to aid in propelling or moving the vessel in the water. Many kinds of material are employed in making sailcloth, but flax and hemp are used most generally. Cotton, jute, linen, and various vegetable fibers are utilized in making certain kinds of sails. Several breadths of canvas are necessary to construct a single sail. They are securely sewed together by a double seam, and a bolt rope is fastened around the edge by means of a strong cord.

The size of the sail depends upon the vessel, since the larger forms require a greater propelling force to move them in the water, hence the size and strength of the sail is proportional to the size of the ship or boat on which it is to be used. It is possible to secure the greatest propelling power when the wind is right astern, but advantage may be gained when it is on either beam by dividing the sail into two parts, the one part acting to cause the vessel to move sideways, and the other having a tendency to propel it forward. Various other combinations are taken advantage of in placing the sails, which make it possible to gain a forward movement with a fairly unfavorable wind, though under such conditions it becomes necessary to have the vessel move in a zigzag course.

The two principal types are square sails and fore-and-aft sails. Square sails are four-sided. They are bent to a yard and are normally at right angles to the keel. Fore-and-aft sails are attached to a boom, gaff, or stay, and are normally nearly parallel to the keel. The upper edge of a sail is called the head; the lower edge, the foot; and the sides in most sails are known as leeches. The lower corners of a square sail

are its *clews*, and the same name is applied to the lower after corner of a fore-and-aft sail. A *tack* is the lower forward corner of a fore-and-aft sail, or the lower weather corner of a square sail, and the *earing* is the upper corner of the latter kind. Sailmaking was an important industry among the ancients and still continues to nold an important place among the industries, although steam is now employed largely in navigation.

SAINT ALBANS (al'banz), a city in Vermont, county seat of Franklin County, 25 miles northeast of Burlington, on the Vermont Central Railroad. The site is two miles from Lake Champlain, on an elevation of 400 feet, within sight of the Green and the Adirondack mountains. The surrounding country is fertile, producing cereals, fruits, and vegetables. Marble quarries are worked in the vicinity. The chief buildings include the county courthouse, the public library, the Villa Barlow Convent, the public hospital, and the Warner Home for the Destitute. Among the industries are a creamery, cheese factories, bridge works, railroad shops, and iron works. It has an extensive trade in cheese, butter, and marble products. Saint Albans was platted as a village in 1859 and incorporated as a city in 1897. Population, 1900, 6,239; in 1910, 6,381.

SAINT ALBANS, a city of England, in Hertfordshire, about twenty miles northwest of London. It has convenient railroad connections with London and other cities. Among the manufactures are silk and other textiles, earthenware, and machinery. It has a number of machine shops and iron foundries. Saint Albans is noted particularly for the Benedictine Abbey founded here by King Offa of Mercia in 795, in which Cardinal Wolsey served as abbot. The city contains a monument to Lord Bacon and the tomb of Sir John Mandeville, a famous traveler. Two battles were fought at Saint Albans in the War of the Roses, in 1455 and 1461. Population, 1918, 17,286.

SAINT ANDREWS, a town of Scotland, in Fifeshire, 35 miles northeast of Edinburgh. It is a seaport of the North Sea, has railroad facilities, and contains the celebrated University of Saint Andrews. This institution was founded in 1411 and is the oldest university in Scotland. In connection with it are a museum, a botanical garden, and a library of 116,000 volumes. Saint Andrews has a fine cathedral, numerous other churches, and a considerable trade. Population, 1918, 8,682.

SAINT AUGUSTINE (a-gus-ten'), a city in Florida, county seat of Saint John County, Florida, near the Atlantic coast, 35 miles southeast of Jacksonville. It is on the Saint Augustine and South Beach and the Florida East Coast railroads. The site is on the shore of Matanzas Bay and is beautified by semitropical vegetation. Among the features are the sea wall constructed by the Federal government, the

Alicia Hospital, the customhouse and post office, the public library, and the ruins of Fort San Marco, now Fort Marion. It has manufactures of tobacco products, utensils, and machinery.

Saint Augustine is the oldest city in the United States. It was founded in 1565, when the Spaniards under Menéndez established it as a center of influence and built a fort here. The streets are narrow in some parts of the city, but within recent years many improvements have been made, and it has become noted as a popular winter watering place. Many remains from the early period of its history have been preserved, including the Ponce de León and the Alcazar hotels, and the former residence of the Spanish governor, now used for the post office. The surrounding country is dotted with orchards of orange and lemon trees and the climate is remarkably equable and healthful. Popu-

lation, 1900, 4,272; in 1910, 5,494.

SAINT BERNARD DOG (ber'nard), the largest domestic dog, so named from the hospice of Saint Bernard, where this breed of dogs has been maintained through many centuries. Two species are marked by distinct characteristics, one having smooth and the other rough hair. The former are considered of greater power, but representatives of both breeds stand about thirty inches high and weigh 150 pounds. These dogs are muscular, stand erect, and have a massive skull and an intelligent expression. The coat of hair is very dense, the feet are broad and powerful, and the nostrils are somewhat dilated. In color they differ materially, but it is usually black or black and white spotted. These dogs are kept in large numbers in the Alpine passes to rescue travelers who are lost in snowstorms, or aid those belated at night. In some cases they are sent ahead of parties to test the safety of ice bridges or trace indistinct or snowcovered roads, which they are able to do through the keenness of the sense of smell.

SAINT BERNARD PASS, the name generally applied to two passes of the Alps. They are distinguished from each other by the names Great Saint Bernard and Little Saint Bernard. Great Saint Bernard is on the east side of Mont Blanc, in the Pennine Alps, between the Canton of Valais, Switzerland, and the department of Piedmont, Italy. It is 8,125 feet high and near its highest part is the famous hospice founded by Saint Bernard de Menthon, in 962, as a refuge of safety for those crossing the Alps. The pass is covered with snow nine months of the year, and the monks of the hospice keep a number of Saint Bernard and Newfoundland dogs to aid in rescuing those in danger or distress from cold. Among the famous armies that traversed this pass were that of the Romans, that of Charlemagne, that of Frederick Barbarossa, and that of Napoleon when invading Italy in 1800. Little Saint Bernard is south of Mont Blanc, crossing the Grecian Alps from the Isère valley, in France, to the Dora Baltea valley, in Italy. 2489

It is 7,175 feet high. Near its summit is a hospice, founded by Saint Bernard de Menthon.

SAINT BONIFACE, a city of Provencher County, Manitoba, on the Red River, opposite Winnipeg, and on the Canadian Pacific and other railroads. It has gas and electric plants, brick yards, and flour and rolling mills. chief buildings include Saint Boniface College, federal building and courthouse, and Roman Catholic Cathedral. It is connected by several bridges with Winnipeg. Population, 1911, 7,483. SAINT CATHARINES (kath'a-rinz), a

city in Ontario, capital of Lincoln County, 12 miles northwest of Niagara Falls, on the Grand Trunk and other railroads. It is on the Welland Canal and is noted for its marine hospital and artesian mineral wells. Among the buildings are the courthouse, high school, and public library. The manufactures include cotton and woolen goods, flour, and machinery. It is a port of entry. Population, 1911, 12,484.

SAINT CHARLES, a city in Missouri, county seat of Saint Charles County, on the Missouri river, 22 miles northwest of Saint Louis. It is on the Wabash and the Missouri, Kansas and Texas railroads. A splendid railroad bridge 6,535 feet long crosses the river at Saint Charles. The noteworthy buildings include the county courthouse, the Daniel Charles Military College, the Sacred Heart Academy, and the Lindenwood Female College. Among the manufactures are flour, tobacco, cotton and woolen goods, dairy products, and earthenware. The public utilities include pavements, sanitary sewerage, and public waterworks. It was settled in 1769 and was the State capital from 1821 to 1826. Population, 1900, 7,982; in 1910, 9,437.

SAINT CHRISTOPHER. See Christo-

pher, Saint.

SAINT CLAIR, a river and lake of North America, which form a part of the boundary between the State of Michigan and the Province of Ontario. The Saint Clair River flows from Lake Huron into Lake Saint Clair. It is about forty miles long and half a mile wide, and is of vast importance in the navigation of the Great Lakes. A railroad tunnel under it extends from Port Huron, Mich., to Sarnia, Ontario, and has a length of 11,550 feet. Lake Saint Clair receives the water from the Saint Clair and Thames rivers, and its surplusage flows through the Detroit River into Lake Erie. It is 30 miles long, is about 25 miles wide, and has an area of 360 square miles. Within it are several islands and it has excellent fisheries. The surface is 575 feet above sea level.

SAINT CLOUD, a city in Minnesota, county seat of Stearns County, sixty miles northwest of Saint Paul, on the Mississippi River. It is on the Great Northern and the Northern Pacific railroads, has an abundance of water power, and is surrounded by a farming and stockraising region. The chief buildings include the county courthouse, the public library, the State

normal school, the State reformatory, the Saint Raphael's Hospital, and the Home for the Aged. The manufactures include lumber products, flour, wagons, farming implements, and machinery. A fine quality of granite is quarried in the vicinity. It was settled in 1859 and incorporated in 1868. Population, 1905, 9,422, in 1910, 10,600.

SAINT CLOUD, a town of France, on the Seine River, six miles west of Paris. It was long noted for the celebrated palace of Saint Cloud, which was used as a summer residence by Napoleon I., Louis XVIII., Charles X., Louis Philippe, and Napoleon III. The palace was destroyed in the siege of Paris in 1870, but the park in which it stood is still one of the finest in the vicinity of Paris. Population, 1918, 6,892.

SAINT CROIX (kroi), a river of North America, forming a part of the boundary between Maine and New Brunswick. It issues from Schoodic or Grand Lake and, after a course of 75 miles toward the southeast, flows into Passamaquoddy Bay. Steamboats ascend to Saint Stephen, a distance of twenty miles. It is sometimes called the Schoodic, or the Passamaquoddy, River.—Saint Croix, a river of Wisconsin. It rises near the southwestern part of Lake Superior, has a southerly course, and flows into the Mississippi 35 miles below Saint Paul. The length is about 200 miles. It has a number of fine falls and forms part of the boundary between Wisconsin and Minnesota.

SAINT CYR (săn sêr), a town in France, two miles west of Versailles, with which it is connected by railway. Louis XIV. founded a school for girls at Saint Cyr, at which Racine's "Ester" and "Athalie" were written expressly for the pupils. The school was suppressed by the Revolution, but Napoleon founded the famous military school at Saint Cyr on its site in 1806, and near it are two of the advance forts of the new enceinte around Paris. Population, 1918, 4,468.

SAINT-CYR, Laurent Gouvain, Marshal of France, born in Toul, France, April 13, 1764; died March 10, 1830. He studied the fine arts, but in 1782 enlisted to serve on the frontier. Soon after he rose to the rank of general of division, commanded a department of the army on the Rhine, and in 1798 was sent to Rome as commander of the army in Italy. Later he joined Moreau in Germany, where he defeated Kray at Biberach, and in 1801 became ambassador to Spain. The following year he commanded the French army in southern Italy, was sent to Catalonia in 1808, and soon after resigned his position. However, he was recalled to the service in 1811, when he took charge of a corps for the invasion of Russia, where he won a noted victory at Polopzk, for which he was made a marshal: In 1813 he was compelled to capitulate at Dresden. He supported the Bourbons and became minister of war under Talleyrand. In 1824 he retired from public life.

SAINT DENIS (săn de-ne'), a city of

France, four miles north of Paris, with which it is connected by railway and rapid transit. It is strongly fortified, has canal connections with the inner harbor of Paris, and contains numerous buildings of historic interest. The famous Abbey of Saint Denis was completed under Philip the Bold and was long the burying place of French kings. Louis XII. caused mausoleums to be built with figures of the princes buried here and monuments were added by all the monarchs up to Henry II. Napoleon founded a school for daughters of the members of the Legion of Honor in the monastery, which still flourishes, and Louis XVIII, improved the museums and added numerous monuments. Saint Denis is at present one of the most beautiful and scenic cities of France. It has many fine buildings and gardens. The principal manufactures include leather, flour, sailing vessels, railway cars, engines, chemicals, textile fabrics, and machinery. The city was so named from the abbey founded by Dagobert on the burial place of Saint Denis, the apostle of Paris. Population, 1916, 64,790.

SAINTE-BEUVE (sănt-bev'), Charles Augustin, eminent literary critic, born at Bolognesur-Mer, France, in 1804; died Oct. 13, 1869. He was born shortly after the death of his father and his early education devolved upon his mother, who gave him the best training possible under adverse circumstances. He entered the College Charlemagne at Paris in 1818 and, after studying medicine for some years, took up a literary course. In 1840 he became keeper of the Mazarin Library, a position that made it possible for him to devote himself studiously to literary criticism and to writing contributions for the Constitutionel. His most important writings include a review of Victor Hugo's "Odes and Ballads" and the 28 volumes embraced in his "Monday Talks." The latter comprises the contributions published in the Constitutionel on Mondays.

SAINT ELIAS (é-lī'as), Mount, an elevated mountain of North America, situated near the boundary between Alaska and British America, elevated 18,100 feet above sea level. It was long thought that Saint Elias is the highest mountain peak of North America, but Mount McKinley is now so regarded, its peak towering 20,464 feet above sea level. Great glaciers move from its perpetually snow-covered sides, and have worn great precipices and chasms in their course to the Pacific. It is an important landmark, for the reason that it is completely isolated from other great peaks. The foothills have forests up to a height of 2,000 feet, but the mountain itself is barren.

SAINT ÉTIENNE (săn-tô-tyĕn'), a city of France, in the department of Loire, of which it is the capital. It is situated on the Furens, a tributary of the Loire, about thirty miles southwest of Lyons. The city has railroad connections with other trade emporiums. Many of the streets are well graded and improved with electric lighting, stone and macadam pavements, waterworks, and rapid transit. The churches of Saint Étienne and Notre Dame are noted structures. It has a school of fine arts, several industrial schools, a museum, and a well-organized public school system. The importance of the place as a manufacturing center is due to the water power drawn from the Furens River. Among the products are firearms, cutlery, Bessemer steel, engines, railway cars, earthenware, and machinery. The ribbon trade is counted the largest in the world and it gives employment to 45,006 weavers. It has a growing export trade in merchandise, coal, and clothing. Population, 1911, 148,656.

SAINT-ÉVREMOND (săn-tā-vr' môn'), Seigneur de, eminent author, born in Saint Denis, France, April 1, 1613; died Sept. 29, 1703. He descended from a noble family of Normandy and, after studying under the Jesuits, entered the military service, taking part in the battles of Freiburg, Rocroi, and Nordlingen. Later he engaged in literary work, but a witty essay on a treaty made between Normandy and England required him to seek safety in flight to Holland and later to England, spending the later years of his life in London. He was a personal friend of Charles II. and other distinguished men of England. Many of his essays, comedies, and letters are counted among the masterpieces of the latter part of the 17th century, all showing much wit and elegant style. An edition of his collected works was published in 1804.

SAINT FRANCIS (sant fran'sis), the name of two rivers in North America, one in the United States and the other in Canada. The former rises in southeastern Missouri, has a general course of 450 miles toward the south. and flows into the Mississippi near Helena, Ark. It forms a part of the boundary between Missouri and Arkansas and is navigable for 150 miles. In several places it expands into long lakes, thought to be due to sinking of the soil as a result of the earthquake in 1811. The Saint Francis River of Canada is one of the important tributaries of the Saint Lawrence. It rises in Saint Francis Lake, in southeastern Quebec, and after a course of 120 miles enters the Saint Lawrence near Lake Saint Peter.

SAINT GALL (săn gàl'), a city of Switzerland, capital of a canton of the same name, six miles southwest of Lake Constance. It is connected with other cities of Europe by a railway line and has a considerable trade. The noteworthy buildings include the public library, the cantonal school, the museum of natural history, and the Roman Catholic cathedral. It has public waterworks, well-paved streets, and electric street railways. Among the manufactures are textile fabrics, chemicals, clothing, and machinery. It was so named from a convent founded here in the 7th century. The German name is Saukt Gallen. It has been a part of the Swiss

Confederation since 1803. Population, 1910, 37,869.

SAINT GAUDENS (sant ga'denz), Augustus, American sculptor, born in Dublin, Ireland, March 1, 1848; died March 1, 1907. He was



AUGUSTUS SAINT GAUDENS.

brought to New York City at the age of six months. After attending the public schools, he took instruction in drawing at the Cooper Institute and in 1867 went to Europe, where he studied art in Paris and Rome. His first work of note is "Hiawatha," which he completed in 1871 while at

Rome. He returned to New York in 1872, and in 1893 served as a juror of acceptance in the sculpture department of the Columbian Exposition. Among his principal works are his statues of Abraham Lincoln, in Chicago; Admiral Farragut, in New York; and Robert E. Randall, at Sailors' Snug Harbor, New York. He made a fine statue entitled "Diana" and the hooded figure called "The Peace of God," now in the Rock Creek Cemetery, in Washington, D. C. His portrait busts include those of Theodore D. Woolsey, William M. Evarts, and William T. Sherman. Other works include the fine equestrian statue of General Logan, in Chicago; the equestrian statue of General Sherman, in Central Park, New York; the Shaw Memorial, in Boston, Mass.; the monument of Peter Cooper, in New York; and the fine figure called "The Puritan," in Springfield, Mass.

SAINT GEORGE'S CHANNEL, the body of water which connects the Irish Sea with the Atlantic Ocean and separates the southern part of Ireland from Wales. It is about 100 miles long and from 60 to 95 miles wide. The depth ranges from 300 to 500 feet.

SAINT GERMAIN (săn zhâr-măn'), a town of France, on the Seine River, seven miles west of Paris. It is famous for the Royal Castle that served as a residence for the kings of France until the reign of Louis XIV., who moved the court to Versailles. The place is noted for its many fine monuments, including one erected by George IV. over the remains of James II. of England, who was an exile in the town. It is the seat of a number of monasteries and several convents. A terrace was built along the river front in 1672, and near the town is a splendidly preserved forest of 10,000 acres. The city has railroad advantages and manufactures of various kinds. Near it are fine orchards. Population, 1916, 17,891.

SAINT GOTHARD. See Gothard, Saint. SAINT HELENA (sant he-le'na), an island in the South Atlantic Ocean, 1,200 miles west of

Portuguese West Africa. It has precipitous shores and a mountainous surface. The area is 47 square miles. The island is of volcanic origin, forming the summit of a former volcano of a submerged region. Diana's Peak is the highest elevation, being 2,750 feet high. A small portion of the surface is susceptible to cultivation and is utilized in the culture of vegetables and fruits. Whale and other fisheries comprise the principal industry. It had a considerable commerce before the Suez Canal was opened to traffic, but at present the trade is principally in fish, which are exported. The imports are articles of food and clothing.

Saint Helena was discovered by the Portuguese in 1502, but it became a British possession in 1651. The island is noted as the place at which Napoleon was exiled after his final defeat at Waterloo, in 1815, and he died there in 1821. He made his home with a farmer named Longwood, and his remains were buried there, but the body was removed to France in 1840, and the Longwood Farm was purchased by the French government in 1858. Gen. Piet Cronje was held there in exile by the British for some time after his capture in the Boer War of 1899-1901. Jamestown, the capital, is the only port and is connected with Europe and South Africa by a cable. In 1916 the island had a population of 7.483.

SAINT HELENS (hěl'ěnz), a city of England, in Lancashire, ten miles northeast of Liverpool. It is important as a jobbing and manufacturing center. Extensive deposits of coal are worked in the vicinity. Public markets, a sewerage farm, electric lighting, street pavements, waterworks, and street railways are among the public improvements. Other features include the public library, the townhall, and Victoria Park. The manufactures include glass, chemicals, iron, copper, and lead. It has a large trade in produce and merchandise. Population, 1911, 96,566.

SAINT HYACINTHE (hī'ā-sīnth), a city of Quebec, capital of Saint Hyacinthe County, 35 miles northeast of Montreal. It is on the Yamaska River and the Grand Trunk, the Canadian Pacific, and other railroads. The chief buildings include the county courthouse, the Saint Hyacinthe College, the city hall, and a monastery of the Dominicans. It has manufactures of hosiery, boots and shoes, leather, woolen goods, and machinery. Electric lighting, waterworks, and pavements are among the public utilities. The inhabitants consist chiefly of French Canadians. Population, 1911, 9,797.

SAINT IGNATIUS COLLEGE (ig-nā'shī-ŭs), an institution of higher learning in Chicago, Ill., under the Jesuit Fathers. It was founded in 1870 and holds high rank among the Roman Catholic institutions. The courses include theology, logic, ethics, astronomy, chemistry, metaphysics, geology, elocution and literature, and languages. It has 650 students.

SAINT JEAN, or St. John's, capital of Saint John's County, Que., 30 miles southeast of Montreal, on the Richelieu River, opposite Iberville. It has manufactures of sewing machines, furniture, brick, and machinery. The chief buildings include the courthouse, postoffice, and College Le Monnoir. The place was settled in 1748. Population, 1911, 5,903.

SAINT JOHN, a river of North America, which rises in eastern Maine. After flowing northeast for some distance, it makes a bold curve and flows toward the southeast, entering the Bay of Fundy. The tributaries include the Big Machias, Aroostook, Allegash, and Tobique rivers. The entire course is 450 miles, of which 150 miles are navigable. It forms the boundary between Maine and New Brunswick nearly to

Grand Falls, below which it is in the latter.

SAINT JOHN, a seaport of New Brunswick, capital of Saint John County, on the Bay of Fundy and the Saint John River. It is on the Canadian Pacific, the New Brunswick South-



ern, and the Intercolonial railways. The harbor is deep and safe, being protected by a breakwater and by Partridge Island, which has a lighthouse and a quarantine hospital. bridges, one a cantilever and the other a suspension bridge, span the river. The site rises rapidly from the harbor and is chiefly rocky and undulating, but the streets are wide and regularly platted. It has an extensive trade in lumber, fish, merchandise, and manufactures. Among the principal industries are shipbuilding, fisheries, and the manufacture of clothing, lumber products, and machinery.

A large majority of the business houses are constructed of brick and stone. The noteworthy buildings include the county courthouse, the public library, the Soldiers' Home, the high school, the Roman Catholic cathedral, the Baptist Seminary, the Masonic and the Odd Fellows' halls, the Wiggins Orphan Asylum, and the Provincial Insane Asylum. It has electric street railways, systems of sewerage and waterworks, and stone and macadam pavements. Saint John was settled in 1635 and was long a point

of contention between the French and English, but became a British possession by the Treaty of Utrecht in 1713. It was chartered as a city in 1785. Population, 1911, 42,511.

SAINT JOHN, John Pierce, public man, born at Brookville, Ind., Feb. 25, 1833; died Aug. 31, 1916. He studied in his native State and in 1862 enlisted in the Federal army, attaining to the rank of lieutenant colonel. Subsequent

to the war he settled in Missouri and later removed to Kansas, where he was elected Governor in 1879. In that capacity he did much to suppress the liquor traffic, and in 1884 was nominated for President on the Prohibition ticket. In 1896 he advocated bimetallism and was prominent as a supporter of Bryan for President in 1900. He lectured extensively on

the subjects of prohibition and woman's suffrage. SAINT JOHN OF JERUSALEM, Knights of, an association of a military and religious character founded at Jerusalem in the Middle Ages. The merchants of Amalfi obtained permission, in 1023, from the Caliph of Egypt to found an institution in Jerusalem for the care of poor and sick pilgrims. The fame of this organization was spread throughout Europe by grateful travelers, who recommended it to those wishing to see the Holy City, and many sent contributions to improve and enlarge its capacity. Although it had a humble beginning, it became a highly successful institution and was the direct cause of founding the Order of Saint John. When Jerusalem was taken by the Crusaders under Godfrey de Bouillon, his soldiers were attended in the Amalfi Hospital of Saint John under the direction of its rector, Peter Gerard. A regularly constituted religious body was formed under the rector, which received the approval of Pope Paschal II. in 1113, and soon after commanderies were established in many Mediterranean towns to protect pilgrims as they passed to and from Jerusalem, and these in time became known as Hospitalers.

The order gradually grew in military and aristocratic power for a century, but in 1289 an Egyptian force was sent to besiege Acre, which was the only remaining Christian seat of influence at that time, but it fell soon after. The knights sailed to Cyprus in 1291 and vainly tried to reëstablish a foothold in Palestine, but they were finally compelled to abandon the project and, instead, undertook the conquest of Rhodes, which was taken in 1310 along with a number of other islands. Here they not only established themselves, but greatly improved the islands, constructing edifices, places of worship, and hospitals. They developed the culture of vegetables, cereals, and fruits. For more than 200 years they maintained themselves against repeated attacks of the Turks, but the fall of Constantinople gave the Mohammedans material advantage and Sultan Solyman finally captured Rhodes in 1523.

The homeless knights were provided for by

Emperor Charles V., of Germany, ceding to them the islands of Malta and Gozo and the fortress of Tripoli in Africa, but they never regained their former importance. However, the powerful fortress of Malta became the bulwark of Christendom and its name was assumed by the order, which became known as the Knights of Malta. In 1551 the Turks conducted a fruitless attack on the island and made a second attack in 1565. The defense under the grand master, Jean Parsiot de la Valette (1494-1568). forced the besiegers to retire. However, they were weakened by divisions that had existed for several centuries, and the crushing blow came in 1792, when the directory of France decreed that the order should be abolished, because it had become an asylum for French refugees. Malta was forcibly seized by the French in 1798, since which time the order has been divided by factions. Several branches are still in existence in Europe, including the German and Italian leagues and the Johanniter. The Hospitalers adopted a Maltese cross as their badge. They wore a red coat and had as their motto pro fide, to which they added pro utilitate hominum, meaning "For the faith and for the service of men."

SAINT JOHN'S, the capital of Newfoundland, in Saint John's County, on the eastern shore of the island, sixty miles north of Cape Race. It is on the Newfoundland Railway and on Freshwater Bay, an inlet from the Atlantic, which furnishes a landlocked harbor. The Narrows, a channel between Pancake Rock and Chain Rock, furnishes a deep entrance into the harbor. Lighthouses of modern construction are located on Cape Spear and Fort Amherst, which comprise two elevations at the Narrows. It has large commercial interests, especially in supplies for fisheries. The manufactures include spirituous liquors, boots and shoes, nails, tobacco, leather, soap, cordage, seines, furniture, and machinery. The export trade in fish and seal oil is extensive.

Saint John's is well built of brick and stone. The noteworthy buildings include the Governor's residence, the House of the Assembly, the Saint John's Athenaeum, the commercial exchange, the customhouse, the county courthouse, the public hospital, and the Roman Catholic cathedral. It is the seat of Anglican, Presbyterian, Methodist, and Roman Catholic colleges. The public utilities include public waterworks, sanitary sewerage, and gas and electric lighting. It was a fishing village as early as 1580. Disastrous fires destroyed much of the city in 1846 and 1892, but it has been rebuilt and greatly improved. Population, 1901, 29,594; in 1911, 32,292.

SAINT JOHN'S, a river of Florida, which rises in Brevard County and, after a course of 350 miles toward the north, flows into the Atlantic Ocean fifteen miles northeast of Jacksonville. It courses through a level region containing many orchards and groves, and is fed by springs and the overflow of swamps. For a distance of 200 miles of its lower course it is about a mile in width, and it is navigable for the largest steamers to Enterprise. It abounds in fish, and near it are extensive forests.

SAINT JOHNS, a city of Porto Rico. See San Juan.

SAINT JOHNSBURY, a village of Vermont, county seat of Caledonia County, 35 miles northeast of Montpelier. It is on the Passumpsic River and the Boston and Maine and other railroads. It is the seat of Fairbanks Museum and the Saint Johnsbury Academy. Among the chief buildings are the county courthouse, the public library, and several fine schools and churches. It has a large trade in merchandise and produce. The works of the Fairbanks Scale Company are located here. Besides scales of various kinds, it has manufactures of steam hammers, clothing, hardware, and farm machinery. Electric lighting, waterworks, and sewerage systems are maintained. The place was settled in 1786 and incorporated in 1884. Population, 1910, 6,693.

SAINT JOSEPH, a city of Michigan, county seat of Berrien County, sixty miles northeast of Chicago. It is beautifully located on the shore of Lake Michigan, at the mouth of the Saint Joseph River, and has communication by the Père Marquette, the Lake Shore and Michigan Southern, and other railroads. Steamers sail regularly between it and other lake ports. It is visited during the summer as a resort by tourists. The surrounding country has productive farms and extensive peach orchards. Flour, ironware, lumber products, canned fruits, and machinery are among the manufactures. Systems of electric lighting, waterworks, and sewerage are maintained. The Carnegie Library and the county courthouse are the leading buildings. The first settlement in the vicinity was made in 1829. It was incorporated as a village in 1836 and as a city in 1892. Population, 1904, 5,322; in 1910, 5,936.

SAINT JOSEPH, the third city of Missouri, county seat of Buchanan County, on the Missouri River, 65 miles northwest of Kansas City. It has transportation facilities by the Chicago Great Western, the Chicago, Rock Island and Pacific, the Chicago, Burlington and Quincy, the Atchison, Topeka and Santa Fé, the Missouri Pacific, and other railroads. Electric lines furnish urban and interurban communication. It is connected with Elmwood, Kan., by

a steel bridge.

Saint Joseph occupies an area of ten square The location along the bluffs of the Missouri affords a healthful site and easy facilities for drainage. The river frontage is about three miles. The streets are regularly platted and many are paved, including pavements constructed of vitrified brick, macadam, and asphalt. Krug Park, in the northern part

of the city, is a fine public resort. Lake Contrary is located in the southern part. Mount Mora Cemetery is a fine public burial ground. The chief buildings include the city hall, the county courthouse, the post office, the public high school, and the Carnegie Library. It is the seat of a State hospital for the insane, the State fish hatchery, the Sacred Heart Academy, and the Memorial Home for Aged People. Among the charitable institutions are Saint Joseph's Hospital and Ensworth Hospital. It has two medical colleges and a number of private and parochial schools.

Saint Joseph is noted as a shipping and slaughtering center. It takes high rank in meat packing, wholesaling, and manufacturing. The output of the packing houses has an annual value of \$52,500,000 per year. Articles of clothing, especially shirts and overalls, are made in large quantities. Other manufactures include saddlery, furniture, flour, crackers, confectionery, boots and shoes, woolen goods, and machinery. It has extensive grain elevators and large shipments of cereals, fruits, and live

stock.

Indian traders and trappers made settlements in the vicinity of Saint Joseph in 1826. The most important of these was at Roy's Branch, where Joseph Robidoux, a Frenchman, opened a trading post. The Blacksnake Hills, now in the heart of the city, were settled in 1830. The name was changed to Saint Joseph in 1843 and it was made the county seat in 1846. After the discovery of gold in California, it ranked as an important emigrant station. Since the close of the Civil War it has grown very rapidly, and has been improved by extensive systems of waterworks, sewerage, and electric and gas lighting. Population, 1900, 102,979; in 1910, 77,403.

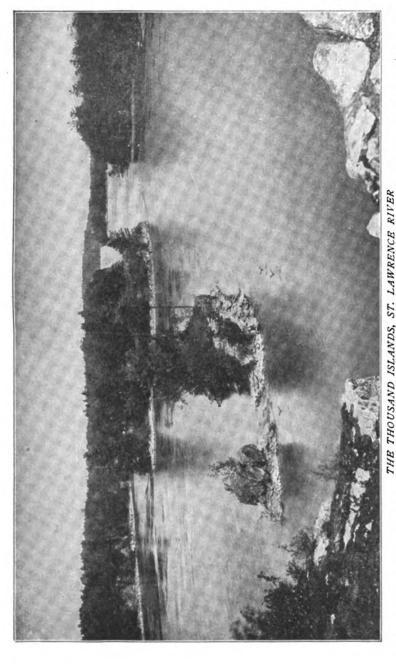
SAINT-JUST (săn-zhüst'), Antoine Louis de, eminent Revolutionary leader, born at Decize, France, Aug. 25, 1767; guillotined July 28, 1794. He first studied at Soissons, but later took a law course at Rheims, where he became imbued with republican ideas and entered the electoral assembly immediately on attaining his majority. A strong friendship sprang up between him and Robespierre, and the two became intimately connected in the great events associated with the Revolution. He was made president of the convention in 1793. At the sitting of the ninth Thermidor, the name of the eleventh month in the calendar of the first French Republic, he made a report that expressed his own views against the king and in favor of a republic. Before concluding his report, he was violently interrupted, and both he and Robespierre were arrested immediately after the sitting. The two perished on the same day along with twenty others, nearly all young men, Robespierre being 36 and Saint-Just 26 years old. His chief writing is an essay entitled 'The Spirit of the Revolution."

SAINT LAWRENCE (sant la'rens), a river

of North America, the outlet of the Great Lakes into the Atlantic Ocean through the Gulf of Saint Lawrence. It may be said that it includes as its basin all the vast region tributary to the Great Lakes, which embraces 510,000 square miles, 187,440 square miles being in the United States and 322,560, in Canada. When viewed from this aspect, its source is in the Saint Louis, a river that rises in northern Minnesota and flows into Lake Superior near the city of Superior, Wis. It is known as the Saint Mary's River, or the Narrows, between Lakes Superior and Huron; as the Saint Clair River, between Lakes Huron and Saint Clair; as the Detroit River, between Lakes Saint Clair and Erie; as the Niagara River, between Lakes Erie and Ontario; and from Lake Ontario to the Gulf of Saint Lawrence it is called the Saint Lawrence. From the source of the Saint Louis to the mouth of the Saint Lawrence the distance is 2,150 miles and from Lake Ontario to the Gulf of Saint Lawrence, 750 miles. As it emerges from Lake Ontario it forms a broad channel that is filled with islands, being known as the Thousand Island Park.

Steamers from the Atlantic formerly ascended the Saint Lawrence only to Montreal, a distance of 600 miles, but now they may navigate the entire lake and river system. Canals are utilized to pass the rapids between Montreal and Lake Ontario, which consist principally of the Lachine, the Cascade, the Coteau, the Cedar, and the Long Sault rapids. Niagara Falls is passed by the Welland Canal and Lake Superior is reached through the Saint Mary's Canal, which passes around the Sault Sainte Marie rapids. The principal tributaries of the Saint Lawrence proper are the Richelieu, Saguenay, Ottawa, Saint Maurice, Chaudiere, and Saint Francis rivers. At its entrance into the Gulf of Saint Lawrence it forms a broad inlet about 100 miles wide, but the general width to Lake Ontario is from one to four miles. Navigation is entirely obstructed by ice during the winter months. The Saint Lawrence forms a part of the boundary between the United States and Canada, separating New York from the Province of Ontario.

SAINT LAWRENCE, Gulf of, an inlet from the Atlantic Ocean, on the northeastern shore of North America. It is partly inclosed by Newfoundland, Nova Scotia, New Brunswick, and Quebec. The Gulf of Saint Lawrence forms a large continuation of the estuary of the Saint Lawrence River, and communicates with the open sea by Cabot Strait, between Nova Scotia and Newfoundland, which has a width of 65 miles. It is also joined to the Atlantic by the Strait of Belle Isle, lying between Labrador and Newfoundland, and by the Gut of Canso, between Nova Scotia and Cape Breton. It has excellent fisheries. The principal islands in the gulf are Prince Edward, Anticosti. Saint Paul's, and Magdalen.



Where the St. Lawrence River forms the international frontier the stream is broken into a maze of narrow and intricate passages by the myriad islets that project from the river's bed. The Lost Channel is a passage tying near to the Canadian shore and often is used by tourist boats. Its scenery, embracing a vista of rocky and wooded islands, is very beautiful and is typical of this portion of the river (Art. Saint Lawrence River)



SAINT LEGER (lěj'er), Barry, soldier, born in England in 1737; died in 1789. He descended from Huguenot parentage, studied at Cambridge, and entered the army as an ensign in 1757. The following year he was sent to America to fight against the French under General Abercrombie, and in 1758 participated in the siege of Louisburg. Later he fought under Wolfe at Quebec, where he was promoted to the rank of brigadier major. In 1777 he commanded one of the three expeditions sent into New York, but was defeated at the Battle of Oriskany, hence was prevented from joining Howe and Burgovne at Albany. Soon after he was recalled to Canada, where he continued to serve on the border of the American colonies. He was promoted to the rank of colonel in 1780 and conducted a guerilla warfare, with headquarters at Montreal, until the close of the Revolutionary War.

SAINT LOUIS (100'is), the largest city of Missouri, metropolis of the Louisiana Purchase, the fourth city of the United States, being exceeded in size by New York, Chicago, and Philadelphia. It is situated on the Mississippi River, about 20 miles below its confluence with the Missouri, and 282 miles southwest of Chicago, Ill. The city is finely located on the west bank of the river, directly opposite East Saint Louis, Ill., with which it is connected by the

famous Eads Bridge.

DESCRIPTION. The city limits include an area of nearly seventy square miles and the river frontage is a little over nineteen miles. It extends west from the river about six miles, stretching over a beautiful and gently rolling tract of land. The site rises gradually from the river to the vicinity of Broadway, one of the leading thoroughfares running in a direcion north and south, but paralleling the river. Between Broadway and the river is the original site, where the streets are somewhat narrow and much jobbing and wholesaling is transacted. From Market Street, which divides the city into northern and southern portions, the buildings are numbered north and south, and the buildings of intersecting streets are numbered westward from the river. In general the streets running north and south are designated by number, beginning with First Street near the river, and the streets running east and west are designated by name. In numbering the buildings, each block begins with a new hundred. Washington Avenue and Olive Street are the principal thoroughfares running east and west. Many wholesale and retail stores are located on these streets near the river, while fashion-able residences line them at the west end. Lindell, Grand, Chouteau, and Franklin avenues are among the leading thoroughfares. Many of the principal streets and avenues are beautified by parks and additions platted independent of each other.

Much has been done in the way of grading

to beautify the city. It has about 425 miles of improved streets, many of which are paved with granite blocks, asphalt, vitrified brick, and macadam. The sewer system comprises 550 miles of mains, and about an equal amount of water mains has been constructed. A large part of the electric wires are below the surface, the conduits for this purpose aggregating about 200 miles. Intercommunication is furnished by a system of electric railways, which has branches extending to East Saint Louis and many other cities and interurban points. Street lighting is furnished by gas and electricity. Practically all of the public utilities are owned and con-

trolled by the municipality.

Parks. About 2,250 acres are included in the parks and squares. Forest Park, the largest in the city, has an area of 1,375 acres. It is located on the west side, in a beautiful residential district, and a part of it was used in 1904 for the Louisiana Purchase Exposition. In the southwestern part are Tower Grove and the Missouri Botanical Garden, both presented to the city by Henry Shaw. They contain one of the most extensive collections of native and forest plants. The former has many beautiful drives and walks and statues of Columbus, Humboldt, and Shakespeare. The latter is popularly known as Shaw's Garden and is famous for its arboretum and the recumbent portrait statue of Henry Shaw by Von Mueller. O'Fallon Park, a tract of 160 acres, borders the bluffs of the river on the north side and contains a race course and a zoölogical garden. Carondelet Park, on the south side, is noted for its beautiful scenery. A marble statue of Schiller is in Saint Louis Park, one of Thomas H. Benton is in Lafayette Park, and one of General Grant stands at the southern entrance of the city hall.

BUILDINGS. Saint Louis is substantially built and contains many noteworthy and costly structures of modern design. The newer buildings are almost exclusively of stone, much of which is quarried within the State. The Union Railroad Station is one of the finest railroad depots in the world, costing \$6,750,000 and having a trainshed covering over thirty tracks. The Federal building, erected at a cost of \$8,000,000, is located on Olive Street. It contains the post office, the customhouse, and the United States subtreasury. An entire square is occupied by the city hall, which is a modern structure and cost about \$2,500,000. The county courthouse, on Broadway, is on the classic style and has a dome 198 feet in height. Among the hotels may be mentioned the Southern, the Planters', and the Lindell, all of which are modern and commodious structures. The leading business and office buildings include the Laclede, the Rialto, the Equitable, the Commonwealth Trust, the Commercial, the board of education, and the public library buildings. Few cities are better equipped with ecclesiastical structures.

They include the Protestant Episcopal Cathedral, the Shaare Emeth synagogue, the Roman Catholic cathedral, the Second Presbyterian church, the Beaumont Street Baptist church, the Pilgrim Congregational church, and the Union Methodist Episcopal church.

EDUCATION AND CHARITIES. Saint Louis maintains a thorough system of public school education, which includes well-articulated courses from the kindergarten to the high school. Washington University, located near Forest Park, is the leading institution of higher learning. Other institutions of higher learning include the University of Saint Louis (Roman Catholic), the Lutheran Concordia Theological Seminary, the Christian Brothers' College, and the Forest Park University for Women. The charitable and benevolent institutions include the Saint Louis Training School for Nurses, the Missouri School for the Blind, and various institutions for infants and adults. It is the seat of the Beaumont Medical College, the Kenrick Theological Seminary, the Saint Louis School of Pharmacy, and the Saint Louis School of Fine Arts.

The public library, aided by Andrew Carnegie, has a fine building and 175,000 volumes. On Broadway and Locust streets is the Mercantile Library, which has a collection of 130,-This institution is famed for its fine paintings and statuary, including much of interest relating to the Louisiana Purchase and the states formed from it. All phases of club life are represented by strong organizations, such as the Mercantile, the Columbia, the German Turner, and the Saint Louis. The Olympic, the Columbia, and the Grand Opera are

the principal theaters.

COMMERCE AND INDUSTRY. Saint Louis is located at an advantageous point on the Mississippi, which furnishes direct steamboat transportation to the Gulf of Mexico and many points on the Ohio and Missouri rivers. As a railway center it may be said to rank next to Chicago, being on direct lines of many trunk railroads. Twenty-four lines enter the city. Among the principal railroads are the Illinois Central, the Wabash, the Chicago, Burlington and Quincy, the Chicago and Alton, the Louisville and Nashville, the Missouri, Kansas and Texas, the Saint Louis, Iron Mountain and Southern, the Saint Louis and San Francisco, the Pennsylvania Lines, the Baltimore and Ohio Southwestern, and the Chicago, Rock Island and Pacific. The railways passing toward the east either cross the Eads Bridge, which is within the heart of public intercourse, or the Merchants' Bridge, which has connection with the Union Station system of terminals partly by an elevated line. Trains going from the Union Station to the Eads Bridge pass through a tunnel under the city. Cupples Station, a group of business buildings, is located so as to handle a large share of the wholesale trade and much of the freight with facility.

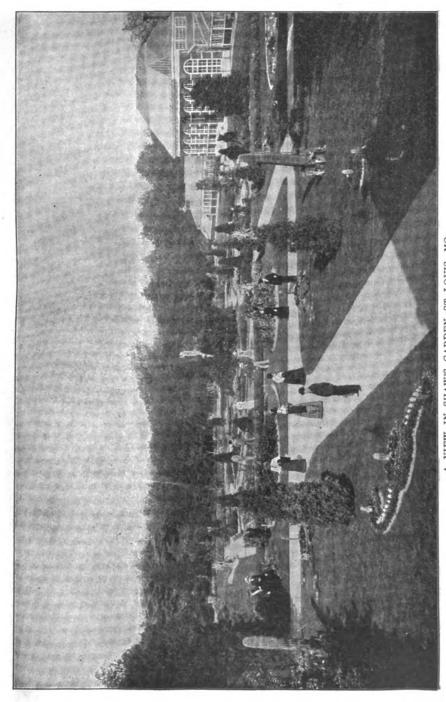
In manufacturing Saint Louis holds a high The annual output of its factories has a value of \$350,000,000. Nearly all lines of manufacturing are represented and the products find a market in all parts of the country and many foreign lands. Malt and spirituous liquors, flour and grist, boots and shoes, brick and pottery, wagons and carriages, iron and steel products, furniture, millinery, glassware, railroad cars, and machinery are the leading manufactures. As a market for grain, cotton, live stock, coal, hides, and fruits it holds a very high rank. Its stock yards and grain elevators are among the largest in the Mississippi Valley. Vast numbers of hogs, cattle, and sheep are han-

dled at the packing houses.

The first permanent settlement on HISTORY. the site of Saint Louis was made by Pierre Laclède Liguest, in 1764, who had conducted a company of French trading merchants to develop that region of the Louisiana Territory. However, the title became vested in Spain and the town was occupied by Spanish troops in 1771, but the territory of Louisiana was ceded back to France in 1800. In 1803 the United States purchased Louisiana from Napoleon, but Saint Louis continued a trading point until its steady growth began in 1830. The Revolution of 1848 in Germany caused a large number of German immigrants to come to Saint Louis, and from that time the city has enjoyed a remarkable growth in wealth and population. The German element was devotedly loyal to the Union in 1861 and under General Lyon captured Camp Jackson. A very large per cent, of the people are German or of German descent, which is evidenced by numerous well-organized musical societies maintained in the city. A destructive cyclone visited the city in 1896, destroying property valued at about \$25,000,000, but the damaged parts were rapidly rebuilt by the construction of newer and more valuable buildings. Forest Park and the campus of Washington University, in the western part, furnished the site of the Louisiana Purchase Exposition in 1904. Table of population follows:

YEAR.	POPULATION.	YEAR.	POPULATION.
1799	929	1866	204,327
1810	1,400	1870	310,864
1820		1880	350,518
1830	5.862	1890	451.780
1840		1900	575,238
1850		1910	687,029
1856	125,200		

SAINT LOUIS, a city in West Africa, capital of Senegal, about 12 miles from the Atlantic Ocean and 100 miles northeast of Cape Verde. It is situated on an island at the mouth of the Senegal River and has railway communication with the interior. The streets are regularly platted and well improved, but the climate is unfavorable to Europeans. The noteworthy buildings include the customhouse, the post of-



Shaw's Garden is one of the chief points of interest in St. Louis. It is the creation of Henry Shaw, an Englishman by birth, whose large fortune was made in St. Louis and whose desire was to make this the greatest botanical garden in the world. It already surpasses every similar institution, with the single exception of the celebrated Kew's Garden in England. The Shaw mausoleum, containing the founder's remains, is in the Garden. A VIEW IN SHAW'S GARDEN, ST. LOUIS, MO.

(Art. Saint Louis)

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fice, and a missionary school. It has considerable trade in grain and fruits, but the harbor is not suitable for large vessels. The town was founded in 1626 and the inhabitants consist chiefly of French and natives. Population, 1916, 25,086.

SAINT LOUIS, University of, an institution of higher learning at Saint Louis, Mo., under control of the Jesuit Fathers. The courses include medicine, commerce, philosophy, sciences, divinity, and military science. The property is valued at \$1,250,000. It has a library of 25,000 volumes. The faculty consists of 235 instructors. It is attended by about 1,500 students.

SAINT LUCIA (100'sha), an island of the West Indies, situated 25 miles north of Saint Vincent. It has an area of 230 square miles. The surface is mountainous and contains a number of active volcanic peaks. Sugar, coffee, spices, logwood, and fruits are the principal products. The island was discovered in 1502 and became French territory, but has been a British possession since 1803. The inhabitants consist mostly of Negroes. Castries is the capital and principal port. Population, 1916, 54,073.

SAINT MARK, Cathedral of, a noted ecclesiastical structure at Venice, Italy. It is situated at the east side of the Square of Saint Mark's, or the Piazza, and is reputed one of the finest structures of its kind in Europe. The building is 250 feet long and 170 feet wide and is decorated by several fine porches. Emperor Nero is said to have received as a present the famous four bronze horses that were set above the central porch, but later they were taken to Constantinople, whence they were brought to Venice. The roof is decorated with numerous cupolas and arches and the interior is finished with beautiful and costly mosaics. Within the cathedral are many artistic treasures, such as church plates and jeweled bookbindings. Work on the original building was begun in 830, but it was destroyed and was again rebuilt in 976. A fire destroyed the second church and a new structure in the Byzantine style was erected in the 12th century. Additions in the Gothic were made in the 15th century. It was attached to the palace of the doge of Venice and remained a place for national worship for many years, but was converted into a cathedral in 1807.

SAINT MARYS, a city of Ohio, in Auglaize County, on the Miami and Erie Canal, 22 miles southwest of Lima. It has transportation facilities by the Ohio Central and the Lake Erie and Western railways, and is surrounded by a farming and fruit-growing country. Near the city is Saint Marys Reservoir, from which water is drawn to supply the Miami and Erie Canal. Among the chief buildings are the high school, the city hall, and many churches. The manufactures include flour, hardware, woolen

goods, and machinery. It has considerable trade in farm produce and merchandise. The first settlement on its site was made in 1795, and it has been incorporated since 1820. Population, 1900, 5,359; in 1910, 5,732.

SAINT MARY'S RIVER, the channel separating the Upper Peninsula of Michigan from Ontario and connecting lakes Superior and Huron. It is about sixty miles long, flowing in a southeasterly direction, and is divided into two main channels by a number of large islands. The Sault Sainte Marie, or Saint Mary's Falls, are a short distance below Lake Superior. They have rapids that fall twenty feet in the course of about one mile. Two ship canals are maintained to avoid the rapids, one on the American and one on the Canadian side. The tonnage of the traffic passing through these canals is enormous, exceeding that of the Sueż Canal.

SAINT MAURICE (săn mō-rēs'), a river

SAINT MAURICE (săn mô-res'), a river in the Province of Quebec. It rises in Lake Oskelanaio. At first it has an eastward, but later a southward, course, and joins the Saint Lawrence at Three Rivers, about midway between Montreal and Quebec. It flows through a heavily timbered country, and about 22 miles above its mouth are falls with a descent of 160 feet. The entire length is 300 miles. Among the principal tributaries are the Ribbon, the Vermilion, the Croche, and the Bastonnais.

SAINT PAUL, the capital of Minnesota, county seat of Ramsey County, on the Mississippi River, immediately east of Minneapolis. It is at the head of navigation, 410 miles northwest of Chicago, Ill., and has communication by extensive trunk railway systems. These include lines of the Chicago Great Western, the Northern Pacific, the Wisconsin Central, the Great Northern, the Chicago and Northwestern, the Minneapolis and Saint Louis, the Chicago, Burlington and Quincy, the Chicago, Milwaukee and Saint Paul, the Illinois Central, and other railroads. An extensive system of electric railways has lines to all parts of the city and furnishes direct connections with Minneapolis, Lake Minnetonka, Fort Snelling, Stillwater, and other points.

DESCRIPTION. The city is finely situated on a gently rolling tract of land, which embraces an area of about 60 square miles. In most places the ground rises gradually from the river, and the general altitude is from 100 to 200 feet above the Mississippi and about 800 feet above sea level. The larger part of the city is located on the north side of the river, which has a general direction toward the northeast at this place, but makes a bold curve near the Union depot, whence it flows toward the southeast. The portion lying on the south side is known as South Saint Paul, which is connected with the north side by numerous wagon and railroad bridges. Another bridge spans the river at Fort Snelling and several bridges furnish connection with Minneapolis. The streets

are regularly platted, crossing each other at right angle in most parts of the city, though some of the thoroughfares near the river are somewhat irregular. Many of the streets are well paved with granite blocks, vitrified brick, asphalt, and macadam. They are well lighted with gas and electricity, are carefully drained of surface water, and contain extensive systems of sewerage and water mains.

PARKS. Como Park, which includes Lake Como, is located in the northwestern part of the city. It has an area of 415 acres and contains many rare shrubs, trees, and flowering plants. Indian Mounds Park, on the bank of the Mississippi, has several bluffs 200 feet high. Lake Phelan, in the northeastern part, is a beautiful sheet of water and is noted for its fisheries. In the western part of the city, along the gorge of the Mississippi, is a finely wooded tract and a short distance west are Fort Snelling and Minnehaha Falls. The parks that belong to Saint Paul proper, both large and small, include about 1,000 acres. They are connected by driveways and boulevards of great beauty, passing in places along the river, over elevations, and to the lakes. In the northwestern part, due west of Como Park, are the State Fair Grounds and the State University Farm.

BUILDINGS. On a lofty eminence, within the heart of the city, is the State capitol building. It is constructed largely of Georgia marble with the foundation and steps of Minnesota granite, and is rated one of the finest structures of its kind in America. The magnificent dome is visible as the city is approached from almost any direction. The building was erected at a cost of \$4,500,000. Opposite Rice Park is the post office, constructed of a gray stone. The city hall and county courthouse occupy an entire square on Fourth and Wabasha streets. Near the river is the Union Station, which is entered by all the trains. The larger office and business buildings include the Pioneer Press, the Endicott, the Manhattan, the Globe, the Germania, the German-American Bank, and the New York Life. Other buildings of note include the Ryan Hotel, the Capital Bank, and the Newspaper Row.

EDUCATIONAL. As an educational center it takes high rank, having a system of well-organized public schools and many institutions of higher learning. The institutions in or near the city include Macalester College, Saint Paul Seminary, the College of Saint Thomas, the Lutheran Concordia College, and the Hamline University. Many private and parochial schools are maintained. Magdalen Hospital, an orphan asylum, and many educational and scientific institutions are well patronized. Three libraries are maintained. These include the State Historical Library with 75,000, the City Library with 60,000, and the State Law Library with 32,000 volumes. The Agricultural College of

the State University, near Saint Anthony Park, is located on a farm of 243 acres.

INDUSTRIES. The city owes its prosperity largely to navigation on the Mississippi and the numerous railroads that-center here. Its railroad yards, terminals, and shops are among the largest in the Union. It has extensive stock yards, located at South Saint Paul, and takes high rank as a slaughtering and meat-packing center. Many large flouring mills and grain elevators are operated. It has an extensive trade in farm produce, live stock, merchandise, and food stuffs. Furniture, hardware, earthenware, clothing, cigars, crackers, and machinery are produced in large quantities. The wholesaling and jobbing district is located near the Union Station, and along the banks of the Mississippi are most of the railroad shops and manufactories. The banks of the Mississippi have been partly diked to insure the manufacturing districts against overflow.

HISTORY. The site of Saint Paul was first settled in 1838 by a Canadian, who built a log cabin. In 1839 the first white child was born here and the town site was platted in 1847. The Indians had a village on the site known as Imnijiska, meaning White Rock, and for some time it was known as Saint Peter, which was formerly the name of the Minnesota River. It was made the territorial capital in 1851 and a railroad line was built from it to Saint Anthony Falls, a distance of ten miles west, in 1862. Saint Paul and Minneapolis have been puilding toward each other with much rapidity, in fact the two cities are continuous, and are commonly spoken of as the Twin Cities. Nearly one-third of the inhabitants are of foreign birth, the larger part being Germans, Swedes, and Irish, in the order named. Population, 1910, 214,744.

SAINT PAUL DE LOANDA. See Loanda. SAINT PETER, a city in Minnesota, county seat of Nicollet County, on the Minnesota River, 75 miles southwest of Minneapolis. It is on the Chicago and Northwestern Railroad and is surrounded by a fertile farming country. The noteworthy buildings include the county courthouse, the high school, the public library. the State hospital for the insane, and the Gustavus Adolphus College (Lutheran). Among the manufactures are flour, earthenware, furniture, machinery, and clothing. It has electric lighting, public waterworks, and sanitary sewerage. The place was settled in 1854, incorporated in 1858, and chartered as a city in 1891. Population, 1905, 4,514; in 1910, 4,176.

SAINT PETERSBURG, or Petrograd, the capital of Russia, at the eastern end of the Gulf of Finland, where the gulf is entered by the Neva River. This stream divides into numerous branches, thus forming a large number of islands, which are occupied by the city and connected by many bridges. Much of the city is built on flat ground, which was formerly marshy, and portions of it are still liable to

overflow when the sea level is raised by high winds blowing from the west. A systematic plan of continually building the city further toward the sea and redeeming tracts covered by water has been pursued for many years, thus adding to the extent of the city and improving its means of access by vessels. Improvements have been made by the construction of concrete and granite embankment, and many of the channels have been greatly deepened by dredging.

DESCRIPTION. The streets are broad and regularly platted, intersecting each other at right angles. They have adequate lighting by gas and electricity and are traversed by an extensive network of electric street railways, but much of intercommunication is by cabs and carriages. The sewerage and waterworks systems are managed by the municipal government. The pavements are chiefly of granite blocks, but asphalt and macadam constitute the street improvements in the outlying and residential sections. The architecture is largely of pale yellow stone, much of which is both artistic and substantial. Nevsky Prospekt, the most fashionable street, is 130 feet wide and about four miles long. Senate Square, in the heart of the city, contains the famous equestrian statue of Peter the Great, erected in 1782. The Alexander Column, constructed of red granite, is in Palace Square.

The fortress of Saints Peter and Paul is located on a small island, which is connected with the mainland by the Troitsky Bridge. It contains the Cathedral of Saints Peter and Paul, where the czars and many persons belonging to the royal families are buried. commercial exchange is located on one of the islands and near it are several educational institutions. Peterburgsky Island, one of the finest in the city, contains many beautiful residences, while others are utilized as public parks and resorts. Retail trading is carried on chiefly by a system of markets and these are managed by the municipality. These markets do not only handle food stuffs, but likewise conduct a large trade in clothing and foot wear.

Saint Petersburg is sometimes called the city of palaces from the large number of edifices of that character. Among them is the famous Winter Palace, a residence of the emperor, with a capacity for accommodating 6,000 persons; the Hermitage Palace, containing a library of 125,000 volumes and 2,500 paintings by famous artists; and the Annitchkoff Palace of the czarevitch. Other important buildings include the Cathedral of Saint Isaac, the churches of Saint Peter and Saint Paul, the government buildings, the stock exchange, the Marble Palace, the buildings of the Holy Synod, and numerous hospitals and national institutions. The Academy of Science, founded by Peter the Great in 1725, has a library of 160,000 volumes. Other institutions of higher learning include

the Institute of Technology, the University of Saint Petersburg, and a number of high schools, academies, and theological seminaries. The Imperial Library is noted as one of the most valuable in Europe and has 1,300,000 volumes. It has many benevolent institutions, scientific and educational associations, public parks, museums, botanical and zoölogical gardens, and theaters.

INDUSTRIES. Saint Petersburg has a vast interior and foreign trade. The former is facilitated by a large number of canals and railroads that center in the city. It has a commodious harbor, extensive wharfage, and connection with all important foreign ports by numerous steamship lines. Formerly much of the foreign business was transacted at Cronstadt, a strongly fortified island town west of the city, but now a deep canal facilitates the entrance of the largest sea vessels to the well-improved harbor of the city. About 3,250 ships leave the port annually. The export and import business aggregates annually about \$145,000,000. It is one of the most important wholesale and industrial cities of Russia. The manufactures include, leather, cotton and woolen goods, clothing, gobelin tapestry, spirituous liquors, glass, sugar, tobacco products, porcelain and glass, farming implements, hardware, clothing, and machinery. It has a large trade in corn, fish, rye, wheat, live stock, lumber, and coal.

HISTORY. A settlement was founded at the mouth of the Neva by the Swedes in 1300, but it was soon after destroyed. The region was occupied by Peter the Great in 1703, in which year he began to build the fortress of Saints Peter and Paul. As a means of establishing the influence of Russia among the powers of the Baltic and to become freed from the adverse influences at Moscow, he removed the capital from the latter city to Saint Petersburg in Many peasants were required by an 1712. imperial order to take up their residence in the new city, which began to grow rapidly. Under the successors of Peter it was greatly improved and embellished. Catharine II. promoted the construction of a network of canals inland and drained large tracts of marshy land surrounding the city. She not only built beautiful palaces for the royal family, but constructed a number as a mark of appreciation for her favorites. Compared to other great cities of Europe, it ranks as one of the newest, but must be reckoned among the finest and wealthiest in the world. About 90 per cent, of the inhabitants are Russians and the remainder consists principally of Germans, Poles, and Lithuanians. Population, 1915, 2,082,852.

SAINT PETER'S CHURCH. See Peter's, Saint.

SAINT PIERRE (săn pyâr'), an island near the mouth of the Gulf of Saint Lawrence, off the coast of Newfoundland. It and the island of Miquelon, in the Gulf of Saint Lawrence, constitute a colony of France. The surface is somewhat rocky and more or less barren. This possession is valuable only for its fisheries and as a station for vessels. It is the only remnant of territory in the northern part of North America which belongs to France. The colony has an area of 91 square miles. Saint Pierre, on the island of the same name, is the capital. The colony has a population of 12,350.

SAINT-PIERRE, Jacques Henri Bernardin de, author, born in Havre, France, Jan. 19, 1737; died Jan. 21, 1814. He studied at Caen



J. H. B. DE SAINT-PIERRE.

and Rouen and soon after engaged as engineer in Later he Malta. was employed as engineer in Russia and Germany and in 1766 went to Madagascar and Mauritius, serving the French government as engineer in the latter island for about three years. He returned to

France in 1771 to publish accounts of his different voyages and engaged in various other literary enterprises. His work entitled "Paul and Virginia" is a beautiful story founded on an incident witnessed in Mauritius. It has been translated into many different languages, including the Russian, German, English, Dutch, and Romance languages. Another work of value from his pen is "Voyage to the Isle of France." Napoleon extended many distinguished honors to Saint-Pierre, enabling him to pass the closing years of his life at Eragny in comfortable circumstances.

SAINT QUENTIN (săn kän-tăn'), a city of France, in the department of Aisne, on the Somne River, 92 miles northeast of Paris. It has extensive railroad facilities and is on the Saint Quentin Canal, which unites the Somme and the Scheldt rivers. Among the noteworthy buildings are the Church of Saint Quentin, the townhall, the public library, and the Hotel de Ville. Among the manufactures are cotton and wooien goods, embroidery, billiard balls, engines, hardware, and machinery. The surrounding country contains many manufacturing towns and is a productive fruit and dairying region. Spanish captured Saint Quentin in 1557. On Jan. 19, 1871, it surrendered to the German army, which was commanded by General von Goeben. The French commander, General Faidherbe lost 10,000 prisoners and many dead and wounded. In 1914 the city was captured by the Germans. Population, 1914, 56,820.

SAINT-SAENS (săn-săn'), Charles Camille, musician and composer, born in Paris, France, Oct. 9, 1835. He was able to play the piano at the age of six years, entered the con-

servatory in 1847, and two years later obtained a prize in a competitive test on the organ. In 1853 he became organist of the Church of Saint Méry, which he resigned after five years to accept a similar position at the Church of Madeleine. He gave his entire time to composition and concert work after 1870. In 1894 he was made commander of the Legion of Honor. His productions include symphonies, operas, church music, and oratorios. Among his best known works are the operas "Henry VIII," "Proserpine," and "Samson and Delilah."

SAINT-SIMON (sant-sī'mun), Claude Henri, Count of, founder of French socialism, born in Paris, France, Oct. 17, 1760; died there May 19, 1825. He entered the army in 1778, and soon after joined other French nobles in assisting the American colonists in the Revolution. His inclination to take little part in the French Revolution caused him to be deprived of his property, but he afterwards speculated in property secured as a part of the national domain by confiscation from the clergy and nobility, realizing a competence. In 1797 he entered upon a line of study to fit himself for reorganizing society, and traveled extensively in continental Europe to come in touch with and learn of the conditions of the laboring and social classes. His time from 1803 until 1813 was devoted almost exclusively to the study and production of socialistic and political literature, many of his writings attracting wide attention.

The work of Saint-Simon called "The New Christianity" takes the form of a religion and embodies the essential elements proposed by him for the reorganization of social life. He advanced the doctrine that social forces should be directed toward improving the moral and physical conditions of the most numerous and the poorest in society, basing the distribution of wealth on capacity and labor. The ambition with which he endeavored to establish socialism caused him to fall into poverty, and in 1812 a small pension was settled on him. However, his financial straits became so embarrassing that he attempted to commit suicide in 1823, which resulted in the loss of an eye. His socialistic doctrines are generally known as Saint-Simonism. "The Industrial Catechism" is one of his chief works.

SAINT-SIMON, Louis de Rouvroy, Duke of, soldier and author, born in Versailles, France, Jan. 16, 1675; died in Paris, March 2, 1755. He was a descendant from Charlemagne and belonged to a different branch of the Saint-Simon family than the preceding. After studying under the care of his mother until 1693, he entered the military service and gained the confidence of Louis XIV., whom he served as courtier. His tendency to personal independence and rigid morality made him unpopular among the aristocracy of the French court, but he

served there with studious devotion and became well informed in relation to the practices and proceedings of every phase of royal life. The later years of his life were spent in writing his celebrated "Memoirs," which were not published in a complete form until after his death, the first edition appearing in 1830. This work is of much historical value for the reason that it contains useful information in regard to public life in the time of Louis XIV., especially regarding the practices intimately connected with court and official circles.

SAINT SOPHIA. See Sophia, Church of Saint.

SAINT THOMAS, the name of two islands, one off the west shore of Africa and the other in the West Indies. The island of Saint Thomas off the west coast of Africa is in the Gulf of Guinea and is a Portuguese possession. It has an area of 355 square miles and produces coffee, sugar, cocoa, vanilla, and tropical fruits. In 1909 it had population 38,463. The island of Saint Thomas in the West Indies belongs to Denmark and is situated 35 miles northeast of Porto Rico. It is 13 miles long from east to west, has an area of 23 square miles, and contains a population of 15,790. Charlotte Amalie, on the south shore, is the capital. The island produces sugar, tobacco, and fruits.

SAINT THOMAS, a city of Ontario, capital of Elgin County, on Kettle Creek, sixteen miles south of London. It is on the Grand Trunk, the Michigan Central, and the Canadian Pacific railroads. The surrounding country is a fertile farming district. Among the principal buildings are the high school, the county courthouse, the public library, and many fine churches. The manufactures include leather, flour, farming implements, railroad cars, and machinery. It has a large trade in grain and merchandise. Population, 1911, 14,054.

SAINT VINCENT (sant vin'sant), an island in the West Indies, belonging to the Windward group, 100 miles west of Barbadoes. It has an area of 145 square miles. The soil is generally fertile and the surface is undulating, but a range of volcanic mountains trends from north to south. The most active volcano is in the northwestern part, called La Souffrière, whose extensive crater is about 3,000 feet above sea level. Among the principal exports are molasses, sugar, rum, spices, cocoa, and fruits. Columbus discovered Saint Vincent in 1498. It has been alternately neutral, French, and British, but since 1783 it has constituted a British possession. Kingston is the capital. Population, 1916, 47,055.

SAINT VINCENT, Cape, the southwestern extremity of Portugal, forming an extensive promontory in the Atlantic. Several important naval battles have been fought in its vicinity. In the first, on June 16, 1693, the English under Admiral Rooke were defeated by the French

with the loss of twelve men-of-war and eighty merchantmen. Another battle of importance occurred here on Feb. 14, 1797, in which the English under Sir John Jervis defeated the combined fleet of Spain and France and thus prevented a French invasion of England.

SAINT VITUS'S DANCE, or Chorea, a disease of the nerves of motion, causing the extremities and other parts of the body to move involuntarily. It is most common among persons from the age of ten to twenty years and is more frequent in females than in males. The early symptoms include a feeling of languor, a furred tongue, and disorder of the stomach. Usually the patient becomes subject to a sense of awkwardness while in the presence of strangers, owing to sudden muscular contortions. Gradually the muscles cease to be under full control of the will, except by a violent and painful volition. In many cases the hands move suddenly in an opposite direction from the one intended, while the face may be distorted by the spasmodic action of the muscles. All actions of the body become very uncertain. Rest, wholesome exercise, a careful diet, and medical treatment are essential.

SAIS (sa'es), anciently a city of Egypt, on the Canoptic branch of the Nile delta. It is celebrated as the seat of many palaces and temples and because it gave its name to the 24th and 26th dynasties of Egypt. Few ruins are left to indicate its former importance, but those remaining, considered in the light of history, make it certain that it contained a vast sepulcher of Osiris, within whose walls were the tombs of many kings. The 26th dynasty made it the capital of Egypt, but when the political center was removed to Memphis it began to decline. Solon and Pythagoras were among the Grecians to visit Sais. Plato was an instructor in its colleges. Close trade relations were maintained between Sais and Athens. Schiller made the legend of the mysterious veiled statue in the temple of Neith the subject of a ballad.

SAKI (sä'kè), a slightly intoxicating beverage manufactured in Japan, which forms the common stimulating drink of the Japanese. It is made from rice and is drunk warm, producing a speedy but transient intoxication.

SALA (sā'là), George Augustus, journalist and author, born in London, England, in 1828; died Dec. 8, 1895. He descended from an Italian family and first studied to become an artist, but soon became interested in literature and journalism. At the time of the Civil War in the United States he corresponded to the London Daily Telegraph, a position which he also held during the Franco-German War in 1870-71, and later traveled as a correspondent in Russia and Australia. In 1885 he made a visiting and lecturing tour of the United States and in 1892 founded Sala's Journal. His best known work include "London up to Date," "My

SALADIN

Diary in America," "In the Midst of the War," "Seven Sons of Mammon," "Paris Herself Again," "From Waterloo to the Peninsula," and "Things I Have Seen and People I Have Known.

SALADIN (săl'á-dĭn), eminent Sultan of Egypt and Syria, born at Tekrit, a town on the Tigris, in 1137; died in Damascus, March 4, 1193. His real name was Salah ed-Din, meaning holiness of the faith, but European writers have generally adopted the name Saladin. His father was the governor of Tekrit under the Seliuk Turks. He early entered the service of Nureddin, Prince of Syria, accompanying various expeditions to Egypt under command of his uncle, who was a general in the army of the prince. He succeeded his uncle as grand vizier and was soon after attacked at Alexandria by a Christian army, but he succeeded in escaping to Palestine, where he reduced several fortresses and defeated his assailants near Gaza. In 1174 he became Sultan of Egypt and Syria, but not without a prolonged contest for succession. At length his title was confirmed by the Caliph of Bagdad, which so strengthened his cause that he succeeded in annexing Mesopotamia and other regions of Asia, and in 1187 defeated a Christian army at Tiberius. On Oct. 2, 1187, he captured Jerusalem and soon after began the siege of Acre, but the Christian garrison obliged him to retreat.

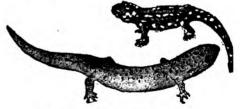
The success of Saladin in conquering large parts of Syria aroused the Christians of Europe to enthusiasm, who organized the Third Crusade under the kings of France and England, but in the meantime Saladin became master of Acre. The Crusaders reached Acre in 1189 under King Richard of England and King Philip Augustus of France and, after a siege of two years, succeeded in capturing it. King Richard soon after defeated a detachment of Saladin's army at Ascalon in 1192, but disagreement among the soldiers prevented his army from reaching Jerusalem. However, a treaty was concluded by which the Syrian coast from Jaffa to Tyre fell into the hands of the Christians, and a truce for three years was agreed upon. Saladin soon after retired to Damascus, where he died the following year. He ranks in history among the most efficient and successful rulers of the Moslems. Besides giving encouragement to industries, he built canals, roads, and dikes. He founded cities and planned to solidify the people under his dominion. He is the most eminent Moslem of the Third Crusade and exemplifies Eastern chivalry to the highest extent. Sir Walter Scott treats the chivalrous side of Saladin in "The Talisman."

SALADO (sà-la'thô), a river of South America, in Argentina. Its source is near the southern boundary of Bolivia, on the eastern slope of the Andes, and, after flowing toward the southeast, a distance of 950 miles, it joins the Parana at Santa Fe. The Salado flows through a fertile region and is navigable about one-third of its course.

SALAMANCA (săl-à-măn'kà), a village of New York, in Cattaraugus County, sixty miles south of Buffalo. It is on the Allegheny River and the Erie, the Pennsylvania, the Buffalo, Rochester and Pittsburg, and other railroads. The surrounding country is agricultural. It has manufactures of cotton goods, gloves, furniture, and machinery. The chief buildings include the public library, the high school, and a number of churches. The vicinity was first settled in 1616 and the village was incorporated in 1878. Population, 1905, 5,435; in 1910, 5,792.

SALAMANCA (säl-à-män'kà), a city of Spain, capital of the province of Salamanca, on the Tormes River, 115 miles northwest of Madrid. Once renowned for its splendid edifices and institutions, it has declined under successive wars and a lack of industry, but within recent years the city has gained materially in population. A railroad line connects it with Valladolid and other places of importance. It has manufactures of clothing, leather, chemicals, and earthenware. Among the most noted buildings are a cathedral in the Romanesque style dating from 1102, numerous other churches, several Jesuit colleges, and its great university. The university was in the height of its prosperity from the 15th to the 17th centuries and at one time had 15,000 students, but at present there are not over 1,250. The great square, designed for bullfights, was long an attraction for the sportive world and has a capacity for 20,000 spectators. Salamanca is mentioned in history as having been captured by the Carthaginians under Hannibal in 222 B. C., but later the Romans expelled the intruders and made it the center of military influence in that part of Spain. It was the scene of a battle on July 22, 1812, in which the French under Marshal Marmot were defeated by the Anglo-Portuguese under the Duke of Wellington. Population, 1910, 26,295.

SALAMANDER (săl'a-măn-der), a class of animals allied to newts, which closely resemble the lizards. Many species have been de-



RED AND SPOTTED SALAMANDERS.

scribed. All have an elongated body, a long tail, and four legs. The young are brought forth in water, where they at first breathe by gills, but later they take mostly to land and breathe by well-developed lungs. Their food

consists of snails, slugs, worms, and insects. The spotted salamander is a representative type. It has peculiar spots on its back and is a sluggish and stupid animal. It is common to the warm and temperate parts of Africa, Asia, and Europe, where it attains a length of about seven The black salamander is somewhat inches. smaller and is peculiar for exuding a milky humor from the pores of the back and sides when alarmed, as a protection against small animals. Allied species are native to the temperate and warm parts of America, but they are more frequently spoken of as newts and efts. These animals were formerly thought to possess a body so cold as to be invulnerable to fire and other forms of heat, but this view has long since been dispersed, except among the illy informed of some parts of Asia.

SALAMIS (săl'ā-mis), or Kuluri, a Grecian island in the Gulf of Aegina, eight miles west of Athens. It has an area of 36 square miles. The surface is rocky and mountainous, but produces grapes, cotton, olives, and mulberry trees. Ambelaki, the chief town, occupies the site of the ancient town of Salamis. Population, 1918,

6,145.

SALAMIS, Battle of, a celebrated naval engagement between the Greeks and Persians in 480 B.C. It occurred off the island of Salamis, near Athens, which is now generally called Kuluri. The battle was fought shortly after the historic battle of Thermopylae. Xerxes commanded the Persian fleet of 1,200 triremes and a large number of smaller vessels, and the combined fleet of the Grecians numbered only 365 triremes. Two main divisions made up the Grecian army, those of the Corinthians and the The former were commanded by Athenians. Adimantus and the latter by Themistocles, but the entire Grecian force was directed by the Spartan Eurybiades. Overconfidence of the Persians and the unwieldy number of their vessels made it possible for the Grecians to charge them with great success and to protect their coast against further Persian attacks.

SAL AMMONIAC (săl ăm-mō'nĭ-āk), the chloride of ammonium, obtained from the refuse matter of gas works. It is found native in volcanic regions and may be produced in small quantities by adding hydrochloric acid to a solution of ammonia. Sal ammoniac is soluble in water, has a specific gravity of 1.45, and is bitter to the taste. It is used in medicine, in gal-

vanizing iron, and in calico printing.

SALAYER (så-li'ēr), the name of a group of islands in the Malay Archipelago, situated a short distance south of Celebes. Salayer Island, the largest of the group, has an area of 250 square miles, while the entire area is 295 square miles. The islets included are Hog, Boneratta, and Kalaura. The group is of coral limestone formation and has a fertile soil. Tobacco, cotton, potatoes, indigo, fruits, horses, and ebony are the principal products. The inhabitants are

chiefly Malays of the Mohammedan faith. Population, 1907, 65,840.

SALEM

SALEM (sā'lem), a port city of Massachusetts, county seat of Essex County, on Massachusetts Bay, fifteen miles northeast of Boston. It is on the Boston and Maine Railroad and has regular communication by steamboats and electric railways. The harbor is comparatively shallow, but has been put in a condition of improvement that renders it quite safe and convenient. It has two fine parks, the Willows and Washington Park, and is well improved by grading, paving, sewerage, waterworks, and gas and electric lighting. The noteworthy buildings include the county courthouse, the customhouse, the city hall, the State normal school, the public library, the Bertram Home for Aged Men, and the Salem Hospital. It is the seat of the Peabody Academy of Science, the Salem Athenaeum, and the Essex Institute. The manufactures include boots and shoes, cotton and woolen goods, cordage, white lead, leather, earthenware, hardware, and

Salem is a Mecca for tourists throughout the year, owing to its early history. It was founded in 1626 and the church erected by Roger Williams in 1634 may still be seen immediately back of Plummer Hall. The famous crusade against witchcraft occurred in 1692, which resulted in hanging nineteen persons on Gallows Hill and the death of another by pressure. Salem is the birthplace of Nathaniel Hawthorne, who wrote the preface to "The Scarlet Letter" in the customhouse. It was incorporated as a city in 1836. Population, 1905, 37,586; in 1910, 43,697.

SALEM, a city in New Jersey, county seat of Salem County, 38 miles southwest of Philadelphia, Pa. It is near the confluence of the Delaware and Salem rivers, on the West Jersey and Seashore Railroad. It was settled by Swedes in 1641, became a stronghold of Quakers under John Fenwick in 1675, and was incorporated as a city in 1858. Pop., 1910, 6,614.

SALEM, county seat of Forsyth County, N. C., 110 miles west of Raleigh, on the Southern and other railroads. It has manufactures of tobacco, machinery, and farming utensils. The features include the courthouse, federal building, and Salem Female College. It was settled in 1766 and incorporated in 1850. Pop., 1910, 5,583.

SALEM, a city of Ohio, in Columbiana County, seventy miles west of Pittsburg, Pa. Communication is furnished by the Pennsylvania and the Pittsburg, Lisbon and Western railroads. It is surrounded by a fertile agricultural country, which contains deposits of bituminous coal. The chief buildings include the high school, the public library, and many churches. Among the manufactures are hardware, flour, pumps, and machinery. It is improved by electric lighting, waterworks, and pavements. The place was settled in 1807 and incorporated as a city in 1887. Population, 1900, 7,582; in 1910, 8,943.

SALEM, the capital of Oregon, county seat

of Marion County, on the Willamette River, 52 miles south of Portland. It is on the Southern Pacific Railroad and is surrounded by a fertile agricultural and dairying country. Much has been done to improve and beautify the site, which rises gradually from the margin of the The noteworthy buildings are the State capitol, the county courthouse, the Federal building, the city hall, the opera house, the high school, the State prison, the State insane asylum, and the State school for the deaf. It is the seat of the Willamette University, the Friends' Institute, the Academy of the Sacred Heart, and the Indian Training School. This city is well improved by electric lighting, waterworks, sewerage, and grading. Among the manufactures are linseed oil, leather, woolen goods, clothing, flour, furniture, tobacco, machinery, canned and dried fruits, and earthenware. The first settlement was made at Salem in 1834, but it was not platted until 1844, and it became the State capital in 1860. Population, 1910, 14,094.

SALEM, a city of India, in the Madras presidency, about 125 miles southwest of Madras, with which it is connected by railways. It is the capital of a government of the same name. It has a number of noteworthy temples, government buildings, and educational institutions. Among the manufactures are carpets, clothing, hardware, earthenware, and machinery. Modern improvements, such as telephones, pavements, electric lights, and waterworks, have been constructed. The surrounding districts produce large quantities of rice, pulse, and fruits. Popu-

lation, 1916, 72,812.

SALERNO (sä-ler'no), a seaport city of southern Italy, on the Gulf of Salerno, 32 miles southeast of Naples, with which it is connected by a railroad. It is surrounded by a stone wall of Gothic structure, but has an unimportant harbor and few modern conveniences. The streets are mostly narrow and in a poor state of repair. It has a number of excellent buildings, including a beautiful Gothic cathedral erected by the Normans, several baths, and a number of celebrated sepulchers. The famous University of Salerno was founded in 1150, but was abolished in 1817. Salerno has improved materially since its railroad line was built and has manufactures of silk and cotton textiles, earthenware, and utensils. The province of Salerno, of which the city of Salerno is the capital, is noted for its production of fruits and wine. Population, 1916, 43,871.

SALFORD (sal'ford), a town in England. See Manchester.

SALIC LAW (săl'îk), the code of laws established by the Salian Franks. The name is applied particularly to one chapter of these laws, that in which succession to certain lands is limited to male heirs to the exclusion of females, chiefly because the possession of those lands implied certain military duties. The Salic Law was applied in France to the succession of the crown

in the 14th century, thus excluding females from

SALICYLIC ACID (săl-ĭ-sĭl'ĭk), an organic acid found in many plants, but the best quality is obtained from wintergreen, in which it forms an essential oil. It is a compound of carbon, hydrogen, and oxygen and is obtained by distilling the flowers of some plants and the bark of others. It is found in combination with the volatile oil of betula in the bark of the sweet birch, in the flowers of the meadowsweet, and in the whortleberry. The taste is sweetish-sour and the properties are antiseptic and antiputrefactive. For commercial purposes it is manufactured either from the oil of wintergreen or from carbolic acid, but the latter is the most important product. It is used in the manufacture of certain dyestuffs, for the preservation of articles of food, and in some cases as a medicine. The foods preserved by this product include milk, eggs, fruits, and pickled vegetables. Antiseptic properties are not possessed by the salts of salicylic acid, but its sodium salt is used for medicine, especially in cases of acute rheumatism.

SALINA (sà-lī'nà), a city in Kansas, county seat of Saline County, on the Smoky Hill River. 38 miles northeast of Ellsworth. It is on the Missouri Pacific, the Union Pacific, the Atchison, Topeka and Santa Fé, and the Chicago, Rock Island and Pacific railroads. Gypsum quarries and salt springs are found in the vicinity. The surrounding country is fertile, producing cereals, grasses, and fruits. Among the principal buildings are the county courthouse, the public library, the Federal building, the Kansas Wesleyan University, and the Salina Normal The manufactures include flour, University. brooms, vehicles, ironware, and machinery. The city has electric lights and other municipal facilities. It has a growing trade in live stock and cereals. The place was settled in 1860 and incorporated in 1870. Population, 1910, 9,688.

SALISBURY (salz'ber-i), or New Sarum, a city of England, in Wiltshire, on the Avon River, eighty miles southwest of London. It has convenient railroad facilities, manufactures of cutlery and clothing, and several public schools. A splendid cathedral, completed in 1258, is its chief building. It is 473 feet long and 111 feet wide, and has a spire 400 feet high. Salisbury has a fine bishop's palace and the Blackmore Museum, the latter containing antiquities collected in America. Among the manufactures are cutlery and clothing. Population, 1917, 18,866.

SALISBURY, a city in North Carolina, county seat of Rowan County, on the Southern Railroad, 115 miles west of Raleigh. It is surrounded by a fertile region, which produces cereals, tobacco, cotton, and fruits. The features include the county courthouse, the State normal school, the Livingstone College, the National Cemetery, and many churches. It has extensive shops of the Southern Railroad. Among the

manufactures are cigars, flour, ironware, rail-road cars, and machinery. It was incorporated in 1770. A Confederate military prison was located here at the time of the Civil War. Population, 1900, 6,277; in 1910, 7,153.

SALISBURY, Robert Arthur, Marquis of, statesman, born in Hatfield, England, Feb. 3, 1830; died Aug. 22, 1903. He studied at Oxford



ROBERT A. SALISBURY.

University, where he completed a course by graduation. In 1853 he entered Parliament for Stamford as a Conservative and in 1868 was created a marquis. He was known as Lord Robert Cecilin the House of Commons until

1865, when he assumed the title of Viscount Cranborne. In 1866 he became Secretary for India, a position he resigned in 1867, but was again appointed in 1874, and in 1878 he was made Secretary of Foreign Affairs. In the same year he and the Earl of Beaconsfield attended the Congress of Berlin as representatives from Great Britain. His party sustained a defeat in the election of 1880, but he succeeded Lord Beaconsfield as leader of his party in the House of Lords, and as such opposed Gladstone's Egyptian policy. When the government of Gladstone fell, in 1885, Salisbury succeeded him as Premier, but resigned in the same year and was again elected in 1886. The Conservatives were defeated in the general election of 1892, when he resigned, but with the success of that party in 1895 he again came into power. He was married to Georgina Alderson in 1857, a lady of considerable ability and influence, who died Nov. 20, 1899. Salisbury became chancellor of the University of Oxford in 1869 and was otherwise accorded distinguished honors.

SALIVA (sà-lī'và), the thin, colorless liquid secreted in the mouth by the salivary glands, which serves to keep the mouth in a moist condition and aids mastication by mixing with the food. Three pairs of salivary glands secrete saliva, known as the parotid, submaxillary, and sublingual. The parotid glands are seated on the sides of the face, between the ear and the lower jaw; the submaxillary, beneath the horizontal part of the lower jaw; and the sublingual, beneath the tongue. They consist of numerous lobes and lobules, which are connected by vessels, ducts, and areolar tissue. The product secreted is conducted to the mouth by ducts. The amount varies, but the usual quantity is about three pounds per day, and in health it is always sufficient to keep the mouth moist. It contains but a small proportion of solids. Besides serving to moisten the food, it assists in

mastication and swallowing, and its peculiar organic principle, called *ptyalin*, acting upon the starch of the food, begins the process of changing it into glucose or grape sugar. Some mammals are destitute of salivary glands, and so also are some reptiles and most fishes.

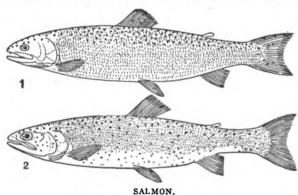
SALLEE (så-le'), or Sla, a seaport town of Morocco, on the Atlantic coast, at the mouth of the Bu-Regreb, 100 miles west of Fez. It occupies a site on the north side of the river, opposite the town of Rabat, and has manufactures of carpets, textiles, and utensils. Its importance is due to a considerable export trade in wool and fruits. It was long a haunt for pirates, but piracy was stopped by European powers in the early part of the last century, although Rabat was bombarded by the French in 1851. Sallee has a population of 12,125, of which about 3,000 are Jewish traders.

SALLUST (săl'lŭst), Caius Sallustius Crispus, eminent Roman historian, born at Amiternum, in the Sabine country, in 86 B. C.; died four years before the Battle of Actium, in 34 B. C. He descended from a plebeian family closely connected with the Sabines, but after securing a liberal education rose rapidly to official distinction. In 59 B. c. he was made quaestor and became a tribune of the people in 52 B. C., casting his fortune on the side of Julius Caesar. He was elected practor in 46 B. c. and soon after accompanied the latter on his campaign into Africa, where he was made governor of Numidia. His administration was oppressive. He enriched himself with such greed that he was accused before Caesar, but escaped being brought to trial.

After returning to Rome, Sallust built vast improvements and gardens on the Quirinal, where he lived the remainder of his life and occupied himself in historical research. His writings are remarkable for their vivid portrayal of character and because they are written in an excellent literary style. They contain many suggestions and accounts of value in military science and geography. The principal works include "Bellum Catilinarium," a descriptive history of Cataline's conspiracy, and "Jugurtha," or "Bellum Jugurthinum," a history of the war against the Numidian king Jugurtha from 111 to 106 B. C. His "Historiarum Libri V." is a treatise of public events from 78 to 66 B. C. Several other historical works have been attributed to him, but they are of doubtful authenticity.

SALMON (săm'ŭn), the common name of a class of food fishes which belongs to the genus Salmo. They are common to both salt and fresh waters and are particularly abundant in the North Atlantic. A number of well-marked species have been described, all of which are among the most important marketable fishes, but those of the North Atlantic are most widely distributed, ranging north of New York in America and north of Spain in Europe. The usual length of the common salmon is from three to four feet

and the general weight ranges from 15 to 30 pounds, but specimens weighing 50 and even 75 pounds are not rare. The color of the adult fish is a steel-blue on the back and head, variegated with grayish or blackish spots, and merging into silvery-white beneath. The flesh has a delicate reddish-orange color. It feeds on animal matter, particularly on minnows, small fish, and herring, but its food varies somewhat with the locality which it frequents. The salmon cannot be said to belong exclusively to either the marine or the fresh-water fishes, but its natural home is near the mouths and estuaries of the larger rivers. However, there are marine species that



1, Salmon Trout; 2, Columbia River Salmon-

inhabit the deeper parts of the ocean and a species occurs landlocked in certain lakes in Maine, New York, and New Brunswick.

It is thought that the salmon obeys a natural instinct in migrating from the sea to spawn in the rivers. This migration occurs annually in the autumn, and, after remaining for some weeks in the stream, both male and female return to the sea. This migratory instinct is so great that rapids and waterfalls are no material obstacle against its advance toward the heads of rivers. Salmon have been seen to leap a height of sixteen feet and, failing to surmount the difficulty, successive trials have been observed. They possess a peculiar ability to suspend themselves and move upward in the falling water by a switch of the tail. The eggs are deposited in furrows made by the female in the gravel lying at the bed of the river, where they are covered by sand moved by means of the tail. Many of the eggs are carried away by the running water or eaten by trout and wild fowl, but these losses are compensated for by the immense fertility of the fish, many hundreds of eggs being deposited by a single female. The eggs hatch in a period ranging from 70 to 140 days. The young fish in its embryo state resembles a tadpole, being only about five-eighths of an inch in length and having a portion of the egg suspended below its body, which serves as food for several weeks. By the seventh week it has grown sufficiently to assume the form of a small fish an inch in length, and it begins to swim about in search of food.

The young salmon before its migration seaward is called a parr. In that stage it ranges from three to eight inches in length. When from one to two years old, it begins to assume a brilliant silvery hue and the fins become darker. It is now called a smolt, or salmon fry, gathers in groups of from 40 to 75, and begins to move slowly toward the sea. On reaching brackish water, the salmon remain at rest for a short time, but soon take to the sea, where their life is unknown. It has been observed that their growth in the open sea is remarkably rapid. A

molt weighing two ounces has been found to attain a weight of from six to ten pounds within a few months. After remaining about three months in the open sea, they return to fresh water weighing from four to six pounds and are known as grilse, or salmon peel. They are capable of depositing eggs when in the grilse state and usually spawn shortly after reaching fresh water, but return soon after to the open sea to develop into the adult salmon. After a second stay in the ocean, ranging usually a period of several months, the salmon return to the fresh water, generally seeking the place of their birth. It is while they move from the sea to the spawning grounds that they are caught in large numbers.

Many methods are used to catch salmon, including by seines, gill nets, and various trap contrivances. Gill nets contain meshes large enough to admit the head of the fish beyond the gills, but are not large enough for the fish to pass through, and when trying to escape they are held fast by the gills. Seines are drawn through the water, but in many places the pound net has taken their place. It is a net that may be set in the water, the fish being guided into it as they move up stream by a straight stretch of upright nets. Fish traps are stationary structures into which the fish are guided and caught. It is not difficult to understand that these devices may be used effectually, since in many streams the salmon force their way to the upper waters in such large numbers that the streams become almost choked. The Columbia, Sacramento, and Frazer rivers are among the most prolific sources of salmon in America, the catch in the Columbia River alone being about 1,500,000 salmon annually. Salmon fisheries of vast value were added to the United States by the purchase of Alaska.

The annual catch of salmon on the entire Pacific coast of the United States and the Dominion of Canada is valued at about \$12,500,000. There is danger that the supply will be exhausted in the course of time unless the rivers are replenished by the fish commissions. Salmon fisheries of importance are found in the Elbe, Tay, and many other rivers of Europe north of Spain. The salmon common to the North At-

lantic is generally known as salmon salar, and differs from the species found in the waters of Northwestern America. The salmon of North America include species known as dog salmon, quinnat or king salmon, silver salmon, blueback salmon, humpback salmon, and salmon trout or steelhead. The salmon is eaten fresh and in a cured state, but in many regions the canned salmon are consumed most extensively.

SALMON TROUT. See Trout.

SALOL (săl'ōl), a white crystalline powder used as a medicine, frequently called salicylate of phenol. It is tasteless and odorless, is insoluble in water, but is soluble in ether, alcohol, and chloroform. It does not dissolve when taken into the stomach, but is dissolved in the duodenum by the alkaline pancreatic juice. As a medicine it is useful in treating rheumatism. It is prescribed as an intestinal antiseptic in cholera and other disorders of the alimentary canal.

SALON (sà-lôn'), the name of an annual exhibition of works of art in Paris, France, in the months of May and June. It is held in the Palais de l'Industrie and is open to living artists of all nationalities. The exhibits consist of engravings, etchings, paintings, pastels, sculpture, and water colors. When the works of art are received at the Salon, they are examined by a jury of experts to determine whether they are worthy of being exhibited. The same jury determines the distribution of medals and the Prix de Rome, which is held in high esteem. This institution dates from 1607, when exhibitions began to be made at the Palais Royal, but two years later it was transferred to the Salon of Carre of the Louvre. It was transferred to its present quarters in 1855.

SALONICA (sä-lô-ne'ka), or Saloniki, a seaport of Europe, in Turkey, on the Gulf of Salonica. It occupies a beautiful site at the head of the gulf, which furnishes a safe and commodious harbor, but the streets are in a poor state of repair and many of them are crooked and narrow. Salonica has railroad connections with cities lying toward the north, which, together with its extensive steamboat lines, give the city an important interior and foreign trade. The trade is chiefly in cotton and woolen fabrics, grain, timber, tobacco, sponges, carpets, live stock, and fruits. Among the manufactures are cotton textiles, woolen and silk goods, clothing, utensils, leather, carpets, and machinery. The principal buildings include a number of mosques, the Christian churches of Saint George, Saint Sophia, and Saint Demetrius, and a number of government offices. Among its ancient buildings is the citadel, situated on a rocky eminence, and in it are the remains of a triumphal arch dating from the time of Marcus Aurelius. Remains of a Grecian hippodrome and Roman triumphal arches have been described by several writers.

Salonica was first known as Therma and is mentioned under that name in connection with the invasion of Greece by Xerxes. Cassander rebuilt it in 315 B. C. and named it Thessalonica, from which the present name was derived. It was the scene of many important military maneuvers throughout the early history of Europe. In 409 the Saracens conquered it after an extended siege. It was possessed by the Normans in 1185 and taken by the Turks in 1430. At present the inhabitants consist of Spaniards, Jews, Greeks, Turks, and Albanians. Population, 1914, 161,282.

SALT, in chemistry, an acid whose hydrogen has been partly or wholly replaced by metal, as sodium chloride; or a compound formed by the union of an acid and a base, as nitrate of silver. The term is applied in a plural form to compounds that can suffer rapid double decomposition with another soluble substance. This is the case when mixing together solutions of nitrate of silver and chloride of sodium, which at once decompose each other and form nitrate of silver and chloride of sodium. The term is often applied to various compounds, such as acetate of ethyl, chloride of ethyl, and even to such fats as stearin and glycerin. In popular usage, the term salts refers to Epsom salts, a saline purgative.

SALT, or Chloride of Sodium, a widely distributed compound, which has been used for seasoning and as a preserver of food from time immemorial. It is an essential ingredient of food for most animals and supplies the chief source of soda and chlorine. Hence, it enters extensively into the market and forms an important product for many uses in chemical and industrial arts. About 3 per cent. by weight of the ocean is made up of it, and vast beds of salt occur in strata of all geological periods from the Silurian up. Extensive deposits of salt are found widely distributed in all the continents. Wild animals obtain it at salt licks, to which they tread trails or paths. Traces of trails may be seen in many sections of North America, especially in the arid regions, most of which were made by elks and bisons. The salt of the market is obtained by evaporating or freezing water taken from the ocean, or by mining in beds of rock salt. In many regions it is obtained from the waters of saline lakes, springs, and wells. Brine springs result from rock salt dissolving under the influence of subterranean streams, notable instances of this occurring in Kansas, Oklahoma, and other sections of the United States. Michigan has remarkable deposits of salt, particularly in the vicinity of Saginaw Bay. Commercial salt also is obtained by evaporating water taken from the ocean.

Vast deposits of salt occur in the Avery Island region of Louisiana. Here the salt strata are reached at a depth of 250 feet below the surface. It is estimated that these deposits have a thickness of about 2,000 feet. Vast deposits of salt occur in Nevada and California, where valuable strata of rock salt, brine springs, and saline marshes are abundant. The most celebrated salt

deposits of Europe are in Prussia, where mines have been worked continuously since the 12th century. Other notable deposits occur in the Crimea, Caucasus, China, Persia, the Sahara Desert, and various parts of Australia. In many arid countries, as in parts of Australia, Asia, and the western sections of North and South America, salt lakes are abundant. In the rainy seasons the lake basins are supplied with an abundance of water, but during the dry times vast deposits of salt form near the shore by the evaporation of the water.

The United States exceeds every other country in the world in the production of salt. At present the annual output is about 3,150,700 tons. It represents a value of \$8,150,000. Much of it is exported to Canada, Mexico, Central America, and the Hawaiian Islands. Canada has vast deposits of salt, especially in the vicinity of Goderich, Ontario, but the annual output does not exceed 80,000 barrels. Besides serving as a preserver and seasoner of food, salt is used as a general mordant, for glazing coarse pottery, in giving hardness to soaps, and for imparting clearness to glass.

SALTILLO (sål-tël'yō), a city of Mexico, capital of the state of Coahuila, 65 miles southwest of Monterey. It occupies a fine site in the fertile valley of the Rio Tigre, has well-paved streets and several public buildings, and is a rail-road center of considerable importance. Among the manufactures are cotton and woolen goods, clothing, and machinery. It was founded in 1586. Near it was fought the Battle of Buena Vista, in 1847. Population, 1910, 35,063.

SALT LAKE CITY, the capital of Utah, county seat of Salt Lake County, near the Jordan River, ten miles southeast of Great Salt Lake. It has transportation facilities by the Union Pacific, the Utah Central, the Rio Grande Western, and other railroads.

DESCRIPTION. The city is beautifully situated at the western base of the Wasatch Mountains and has a general altitude of 4,250 feet above sea level. It is regularly platted, the streets crossing each other at right angles, and the thoroughfares are wide and well graded. Many of the streets are well paved with stone, asphalt, and macadam and a small stream of water runs next to the curb of most of the paved streets. Extensive systems of electric lighting, waterworks, and electric railways are maintained. Electric power is developed by a cataract in a mountain some distance from the city, both for lighting and industrial enterprises. The street railways reach all parts of the city and many suburban and interurban points. In the vicinity of Salt Lake are hot sulphur springs, and bathing resorts are maintained on the shores of Great Salt Lake. The most popular bathing places are at Saltair and Garfield Beach, both of which are finely improved and attract large numbers of visitors and tourists.

Buildings. Temple Block, near the heart of

the city, contains the celebrated Mormon Temple, the Tabernacle, and the Assembly Hall. This tract consists of about ten acres, and here the Mormon Church has its official seat and headquarters. The Mormon Temple, which is the most beautiful and costly building in the city, was completed in 1892. It was formally dedicated on April 6, 1893, that being the 63d anniversary of the Mormon Church. Forty years were required to complete the structure and the total cost, estimated in value of material and labor at the time, was \$12,000,000. It is of granite, 187 feet long and 99 feet wide, and each end has three lofty towers, the highest of which is 223 feet above the foundation. The highest spire is surmounted by a statue of the angel Maroni, which is 12 feet in height and finished with gold-leafed plating. The Tabernacle is elliptical in form, 250 feet long and 150 feet wide, and has accommodations for 10,000 persons. It has self-supporting arches in the roof, which is 70 feet high, and is noted for its superb acoustic properties. The great organ in this structure is considered one of the finest in America. Several other buildings connected with the Mormon Church are of interest, including the tithing storehouses, the former residences of Brigham Young, and the Latter Day Saints' College. A monument surmounted by a statue of Brigham Young stands in front of the Temple

Among the principal public buildings are those of the city and county, the Exposition Building, the Salt Lake Theater, and the Holy Cross and the Saint Mark's hospitals. The University of Utah, a coeducational institution, is maintained by State support. It is situated on the site of Fort Douglas, which was granted by Congress in 1893. The city has a State normal school and many private institutions, including Gordon Academy, All Hallow's College, Rowland Hall, and Salt Lake Collegiate Institute. All of the leading Christian denominations are well represented by organizations and many fine church buildings are maintained. The public library contains 25,000 volumes and other collections of books are in the educational institutions and in the State law library, which has 15,000 volumes.

INDUSTRIES. The city has extensive interests in jobbing and wholesaling and is the most important commercial city between Denver and the Pacific coast. Several smelters and mineral mills are operated. It is the headquarters of a number of large mining companies that operate in the vicinity. It has a large trade in live stock and farm products, although irrigation is necessary to maintain the productiveness of the country. Among the leading manufactures are saddlery, boots and shoes, malt and spirituous liquors, pipe tobacco and cigars, furniture, machinery, and railway cars.

HISTORY. Brigham Young founded Salt Lake City in 1847, at which time the region was far from settlements and was noted as an arid and waste country. Under the persevering influence and industry of the early settlers the region was transformed into a district of fertility and wealth, and the city ranks among the most beautiful and prosperous in the United States. The organization as a city dates from 1851. After gold and silver were discovered in the vicinity, a large number of non-Mormons settled here, and this class now constitutes about one-third of the inhabitants. Population, 1910, 92,777.

SALTON SEA, an extensive body of water in the southwestern part of California, located a short distance northwest from the Gulf of California. The basin is about 200 feet below sea level and the water covers an area of 500 square miles, located within what is known as Imperial Valley. It is thought that the basin was once occupied by the water of the Gulf of California, but in recent times it has been quite dry. In the summer of 1891 the Colorado River became unusually high, causing an overflow to find its way into the basin. American capitalists undertook to irrigate the district by waters from the river in 1900, and the river, from which there is considerable fall, cut the irrigating canal to the extent that the waters became uncontrollable. In 1905 a large section of country was inundated and the Salton Sea was over 70 feet deep in some places. Many millions of dollars' worth of property were destroyed by this flood, which was finally stopped in 1907. Large deposits of salt abound in the basin, hence the fresh water of the river became salty in the basin.

SALTPETER (salt-pe'ter), or Nitre, a white crystalline substance, which has a saline taste. It is obtained by leaching from certain soils, in which it is produced by the process of nitrification, a method of oxidation in which nitrogenous vegetable and animal matter, in the presence of air, moisture, and some alkaline basic substances, is converted into nitrates. Native deposits of saltpeter occur in India, Persia, and other countries of Asia, but the commercial supply is now prepared largely from the deposits of nitrate of soda found in Chile and Peru. In preparing it a double decomposition is effected between nitrate of soda and either potassium chloride or potassium carbonate. Solutions of the two substances are mixed in a boiling state and the sodium chloride or carbonate is formed. Being much less soluble in boiling water than the saltpeter, or potassium nitrate, it may be readily separated. Saltpeter crystallizes in sixsided prisms. It is used with common salt and sugar in curing meat, as an oxidizing agent, in glass making, in metallurgical operations, in the manufacture of gunpowder, and in pyrotechnics. It has an important place in pharmacy. Native nitrate of soda is valuable as a fertilizing manure, for which purpose largely quantities are shipped from Chile and other South American

SALTS, the name of many compounds formed by the action of acids upon bases, in

which one atom of a univalent element is substituted for one atom of hydrogen. These salts include potassium nitrate, sodium chloride, and silver chloride. Other salts are formed by the substitution of one atom of a bivalent base forming element for two atoms of hydrogen, such as zinc chloride and barium nitrate. The list includes a large number of acid salts, such as sulphate of iron or green vitriol, which is formed by the union of sulphuric acid and iron.

The name smelling salts is applied to a preparation of carbonate of ammonia with fragrant volatile oils. Products of this kind are used to diffus, sweet scents, or to restore persons who suffer from faintness. They rely for their pungency upon ammonia, while the agreeable scents are derived from various oils, such as the oils of cloves, lemon, bergamot, and lavender. Fancy bottles are manufactured to contain these products and they are usually ornamented with silver

and gold decorations.

SALTUS (sal'tus), Egar Evertson, author, born in New York City, June 8, 1858. He completed a course in Saint Paul's School at Concord, N. H., and later attended the Sorbonne and the universities of Munich and Heidelberg. In 1880 he graduated from the Columbia Law School, and soon after turned his attention to literary work. His chief publications embrace works of fiction, though he also wrote on biographical and philosophical topics. Among his publications are "Anatomy of Negation," "Philosophy of Disenchantment," "When Dreams Come True," "Truth About Tristrem Varick," "A Transaction in Hearts," "A Story Without a Name," "Imperial Purple," and "The Pace that Name," "Imperial Purple," and "The Pace that Kills." His brother, Francis Saltus Saltus (1849-1889), wrote "Honey and Gall" and a number of volumes of poetry.

SALTZMANN (zälts'man), Karl, painter, born at Berlin, Germany, in 1847. He studied in his native city and at the University of Düsseldorf, and subsequently traveled in Southern Europe to inspect art galleries. His first works to attract general attention were "Views of the Coast" and "Harbors of Holland," which have since been placed in the collection of the Emperor of Germany. From 1878 to 1880 he accompanied Prince Henry on a trip around the world. He was made instructor of the Berlin Academy in 1894, and was given a number of awards and medals for excellence in painting. His chief works include "In the Pacific Ocean," "Entrance to the Harbor of Kolberg," "Sailing Vessel in Drift-ice," "Surrender of Danish Ships at Eckernförde," and "Opening of Kaiser Wilhelm

SALVADOR (säl-và-dōr'), Republic of, the smallest of the Central American states, which is situated southwest of Honduras. It is 140 miles long from east to west and has an area of 8,135 square miles. Much of the surface is gently undulating, but there are ranges of volcanic mountains traversing through the central part, with

peaks ranging from 3,500 to 9,000 feet above sea level.

DESCRIPTION. The Pacific coast is a generally level plain, from which valleys extend along the streams to the boundary of Honduras and Guatemala, and a considerable valley region extends through the northern part. The western boundary is formed by the Santiago River and along the southeastern coast is the Gulf of Fonseca, a large inlet from the Pacific. A large part of the general drainage is toward the south. The chief river is the Lempa, which is navigable a short distance, and the principal inlet is Jiquilisco Bay. The soil is remarkable for its fertility.

INDUSTRIES. The climate and rainfall are favorable to the production of cereals, grasses, fruits, and vegetables. Agriculture is the chief industry, but comparatively large interests are vested in mining. Among the chief products are sugar, coffee, indigo, tobacco, balsam, maize, cotton, and timber. The mineral deposits include gold, silver, iron, copper, mercury, and coal. Cattle, horses, mules, and sheep are reared in abundance. The manufacturing industries are in a primitive state, but the country has the elements that permit development, since the natural resources supply an abundance of material to render manufacturing enterprises profitable. Among the leading manufactures are flour, indigo, sugar, balsam, and rum. A majority of the trade is with Great Britain and the United States.

GOVERNMENT. Salvador is divided into fourteen departments and the government is modeled after that of the United States. The president is elected for a term of four years and has the assistance of a cabinet of four departments. Legislative authority is vested in a congress of seventy representatives, elected by popular vote for terms of one year, and the judicial power is vested in a supreme court and a system of inferior courts. The standing army numbers about 4,250, but it is not well equipped, and the national militia is placed at 18,000 men and officers. The navy is not of material importance, including only a few ships and gunboats. Education is free and attendance at school is nominally obligatory. Besides the elementary schools, there are high schools in the towns and cities, two normal schools, and a national university with faculties of law, medicine, sciences, and engineering.

GENERAL. In 1917 the country had 280 miles of railroads. Some of the highways are well built and several canals are maintained. Spanish is the spoken and official language. Roman Catholicism is the state religion, but other denominations are tolerated. Salvador is the capital and largest city. Other cities include Santa Ana, San Miguel, Nueva San Salvador, San Vicente, and Sonsonate. A large proportion of the inhabitants are natives and mixed races, 234,648 of the former and 772,200 of the latter. Population, 1915, 1,268,692.

HISTORY. Salvador was long known as Cus-

catlan. It was conquered for Spain by Pedro de Alvarado in 1525. It became independent from that country in 1821, when it joined the Mexican confederation, but became an independent republic in 1853. The present constitution was adopted in 1864, but it has since been revised several times. Salvador is the most densely populated republic of Central America, but its material progress has been retarded considerably by local dissensions and revolutions. The people have generally opposed the proposition to form a union of the Central American states.

SALVATION ARMY, an organization formed in England by William Booth in 1865, whose mission is the salvation of mankind by spreading the Gospel. In this work he was assisted by his wife, both of whom had formerly been members of the Methodist New Connection. After conducting a mission in the eastern part of London, at which many depraved persons were changed into earnest converts, the mission was reorganized and called the Salvation Army. and by this name it has been known since 1878. Military phrases were generally adopted, the leader being called a general; evangelists, officers of different grades; and candidates, cadets. The uniforms differ according to the customs of a country, but are quite similar in the United States, Australia, and the countries of Europe, while in parts of Asia red or white garments are most prevalent. Everywhere the army prepares a map on which the country is represented in districts and each section is placed under the charge of a major. This officer is assisted by one or more corps under a captain, who is assisted by lieutenants.

The army was equally applauded and opposed from the first, but in its quiet way it has won a large following, everywhere practicing self-denial and coming in touch with the common people. Both men and women wear characteristic uniforms, the latter being distinguished principally by poke bonnets with red trimmings, and in this manner parade the streets with banners, drums, timbrels, and songs. Crowds are induced to assemble at convenient places, and after a brief service the parade is conducted by the leader to the church or hall, where the services are continued. Members are pledged to temperance, unselfish lives, and belief in the Bible, and each is encouraged to give glad obedience and lead a spiritual, enthusiastic, Christian life. No distinction is recognized between the sexes as to rank, duty, or opportunity, and all persons are welcome to membership with a spirit of good cheer and devotion.

The army made its first appearance in France in 1880 and in the same year began its crusade in Canada and the United States. Ballington Booth took charge of the American branch in 1883, but in 1896 organized a separate society known as *The Volunteers*. Booth-Tucker is at present the commander of the Salvation Army in North America. The army has 775 stations

on this continent, 3,250 officers, 25,000 active workers, and about 425,000 members. It maintains 150 relief stations and a number of educational institutions. The total membership in the world is growing rapidly and the work is conducted in about 35 different languages. The War Cry is its principal publication. It is issued in England, but there are editions in French, German, and Swedish in New York City. Other periodicals include The Young Soldier, Conqueror, Harbor Lights, and Social News. General Booth published his "In Darkest England and the Way Out" in 1890, with which he laid the foundation for providing means to establish places of work for the homeless.

SALVINI (sål-vē'nē), Tommaso, tragedian, born in Milan, Italy, Jan. 1, 1830; died Jan. 1, 1916. He studied in Milan and, after securing a liberal education, became connected with the Royal Theater, at Naples. In 1849 he took part in the Italian Revolution, but soon after resumed stage life. His greatest success was attained on the 600th anniversary of Dante's birth, which was celebrated at Florence in 1865, when he took the part of Lancelotto in the tragedy, "Francesca di Rimini." He visited the United States in 1875 and in 1881, and both times obtained remarkable success. It may be said that his success rested on his perfect elocution and dramatic power, but these were reënforced by noble bearing and his splendid physique. He retired from the stage in 1884 to take up his residence in Florence. His chief parts were Saul, Hamlet, Orosmane, and Othello. King Victor Emmanuel conferred upon him the honor of knighthood. His son, Alexander Salvini (1861-1896), is likewise noted as an actor.

SALWIN (säl-wēn') or Salween, a river of Asia, rises in Central Tibet and, after a general course of 800 miles toward the east and south, flows into the Gulf of Martaban, an inlet from the Indian Ocean. Several lakes are in the upper course, but in some places it flows through steep cliffs, and the valley has much fertility. Rapids obstruct navigation, but steamboats ascend as far as Moulmein, to which place large quantities of teak and other timber are floated. The basin of the Salwin includes 62,750 square miles.

SALZBURG (zalts'boorg), a city of Austria-Hungary, in the province of Salzburg, on the Salzach River, 62 miles southeast of Munich, Germany. It occupies a beautiful site on both sides of the river, which is crossed by several bridges. It has railroad conveniences and communication by electric railways. Among the buildings of note is the Castle of Hohen-Salzburg, a fine structure dating from the 11th century. During the Middle Ages it was the seat of archbishops, who held the rank of princes of the German Empire. Salzburg has a fine cathedral, numerous hospitals and educational institutions, and a statue of Mozart, who was born here. The manufactures include musical instruments, clothing, pottery, and machinery.

The surrounding country is highly fertile and the city is one of the most beautiful in Europe. It has belonged to Austria since 1814. Population, 1910, 36,210.

SAMAR (sä'mär), an island of the Philippines, situated southeast of Luzón, from which it is separated by the Saint Bernardino Strait. It has an area of 5,800 square miles. The coast line is indented by many gulfs and bays and the surface is more or less mountainous. The soil is remarkable for its productive fertility. It has vast forests of valuable timber and mineral deposits of considerable value. Horses, cattle, and swine are reared in abundance. Among the principal products are timber, palm oil, rice, tobacco, hemp, cocoa, and fruits. Catbalogan, population 6,072, is the capital. Population, 1918, 198,836.

SAMARA (så-mä'rà), a city of southeastern Russia, capital of the government of Samara, at the confluence of the Samara and Volga rivers. It has an important river and railroad trade with Russian and foreign cities. Among the manufactures are soap, leather, machinery, clothing, and spirituous liquors. The noteworthy buildings include a government house and many fine schools. It is one of the chief grain markets on the Volga and has a large trade in live stock, fish, tallow, and salt. Electric railways, pavements, and waterworks are among the improvements. It was founded as a fort in 1586. Population, 1916, 98,645.

SAMARANG (sä-má-räng'), a sea-port of Java, on the northern shore, 380 miles southeast of Batavia. It is the third city of the island in population and commercial importance. The city has a good harbor, which has been improved by the construction of docks and wharves. It is the seat of a growing trade in coffee, to-bacco, rice, sugar, indigo, and fruits. A railroad line has been built inland. The inhabitants consist largely of Malays, Arabians, and Chinese, but it has a fair proportion of European business and professional men, who maintain churches, schools, and several institutions of higher learning. The part of the city occupied by the Europeans has well-improved streets and modern facilities. Population, 1916, 93,244.

SAMARIA (sá-mā'rĭ-à), an ancient city of Palestine, the capital of Israel from the time of Omri to the fall of the kingdom. It occupied a steep hill, called Shomeron, in the center of Palestine, and was so named because the hill forming the site resembled a watch mountain. read in the I Kings, xvi., 23-24, "And he (Omri) bought the hill Samaria of Shemer for two talents of silver, and built on the hill, and called the name of the city which he built, after the name of Shemer, owner of the hill, Samaria." It is thought the purchase was made in 925 B. C., when Samaria became the seat of government. It was unsuccessfully besieged by the Syrians in 872 B. C., but Shalmaneser, King of Assyria, captured it in 721 B.C., after a siege of

SAMARITANS

three years. About that time Sargon succeeded Shalmaneser and carried the Hebrews into Babylonian captivity, while their own lands were occupied by colonists from Assyria.

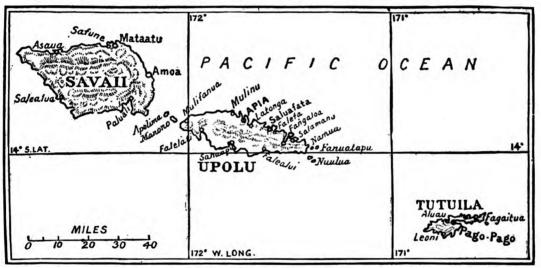
From the Jews remaining in Samaria and the Assyrian colonists descended the Samaritans, a powerful religious sect. Though embracing the religion of Israel, they were refused permission to aid in rebuilding the temple at Jerusalem, and accordingly built a rival temple on Mount Gerizim in 409 B. C. Henceforth the two classes were at enmity with each other, which ultimately ended in a war and the destruction of Samaria under John Hycranus, a Jewish leader, in 109 B. C. It was made a Roman colony in the 3d century, but declined after the Mohammedan conquest, and on its site is the small village of Sebustieh. The Samaritans still exist as a religious sect, but differ from the Jews in that they reject the traditions and hold only to the Pentateuch, of which they possess their own version.

SAMARITANS. See Samaria.

SAMARKAND (sam-ar-kant'), or Samarcand, a city of Asiatic Russia, in western the capital of the great empire of Tamerlane, when it had a population of 150,000. The Russians annexed it in 1868. They have garrisoned it and greatly improved its streets and enlarged its trade. Population, 1918, 91,384.

SAMNITES, the name of several tribes who occupied a part of ancient Rome, where they dwelt as contemporaries of the Sabines. They were a confederation of tribes, organized more perfectly than the Sabines, from whom they appear to have descended. Later they came in contact with the Romans in the northern part of Campania and were finally defeated in 272 B.C. Ultimately they were absorbed by the Romans, whose language and customs they adopted.

SAMOAN ISLANDS (sa-mo'an) or Navigators' Islands, an island group in the Pacific Ocean, east of the northern part of Australia and 4,200 miles southwest of San Francisco, Cal. It embraces twelve islands, but only three are of particular importance. These are Upolu, Savaii, and Tutuila, the last named belonging to the United States and the remainder of the group to Germany. The area of the group is



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SAMOA, OR THE SAMOAN ISLANDS.

Turkestan, 128 miles east of Bokhara. It is situated on the Transcaspian Railroad and is surrounded by a fertile plain. Among the noteworthy buildings are several dating from the early historic period. They include three sacred colleges, situated in the center of the city, and the palace of the emirs of Bokhara, which has been converted into a hospital by the Russians. It has a considerable trade in cereals, salt, live stock, and fruits. The manufactures include woolen and silk textiles, pottery, clothing, leather, utensils, and machinery. Samarkand was captured by Alexander the Great while on his march to Southern Asia. It became a sacred Moslem city after it was captured by the Arabs in 712 A.D., and in the 14th century it was made

1,700 square miles. These islands are of volcanic origin, but in some regions are characterized by coral additions and reefs. Their surface is diversified by hills and mountains, but in the main it is remarkably fertile, with an abundance of wood and luxuriant vegetation. No native fauna prevails in the islands, the only indigenous animal being a species of bat. The principal productions are cotton, coffee, sugar, tobacco, cocoanuts, copra, and many kinds of fruits. Cattle, horses, swine, sheep, and poultry have been imported within recent years and are now raised successfully. The islands are of importance for their location on the direct route between the Panama Canal and the East Indies.

The natives of the Samoan Islands are of the brown Polynesian race and were long governed by a native king. They engage principally in fishing and fruit culture. In 1889 an agreement was effected whereby the islands became neutral under a protectorate of Germany, the United States, and Great Britain. After complications in regard to the election of a king, a different treaty was made and all but Tutuila passed to the possession of Germany. This treaty was ratified by the United States in 1900. Tutuila has an area of 54 square miles and on its shore is the fine harbor of Pago-Pago. Savaii is the largest island of the group, having an area of 658 squo.e miles. Upolu has an area of 340 square miles. The latter contains the town of Apia, with a population of 1,950. It is the capital of the German possessions. The British occupied these possessions in 1914, and placed them under the administration of New Zealand. Population, 1915, 39,885.

SAMOS (sā'mŏs), an island off the coast of Asia Minor, in the Aegean Sea, 45 miles southwest of Smyrna. It has an area of 180 square miles and forms a principality of Turkey. The surface is diversified by a range of mountains, of which Mount Kerkis is the culminating peak, 4,730 feet high. It has an abundance of timber, a fine climate, fertile soil, and adequate rainfall. The principal products include corn, olive oil, raisins, wine, skins, and fruits. It has valuable deposits of iron, lead, marble, and other minerals. Among the manufactures are leather, spirituous liquors, utensils, clothing, carpets, pottery, and textile fabrics.

Anciently Samos was one of the most famous Grecian islands and formed an influential member of the Ionic confederation. It possessed a powerful navy and under Polycrates, in 532 B. C., it was the predominating influence of the archipelago. It became a Roman province in 84 B. C., when its capital was made a free city. Samos was conquered by the Turks in 1550 and did not rebel against Turkish rule until in 1821. Though that war established the independence of Greece, Samos remained a Turkish possession, but since 1832 its government has been administered under a Greek prince, tributary to the Sublime Porte. Chora is the chief town. In 1918 the island had a population of 51,608.

SAMOTHRACE (sä-mō-thräs'), or Thracian Samos, an island in the northern part of the Aegean Sea, belonging to Turkey. It is the most elevated island of the Grecian Archipelago. The area is 65 square miles. The highest peak, Mount Saoce, is 5,245 feet above sea level. This mountain may be seen from the Plains of Troy. From its summit Poseidon watched the decisive contest in the Trojan War. It has no harbor of importance, but has a considerable area of fertile soil, and is celebrated in history as the scene of sacred worship to the Cabeiri. The inhabitants aided Xerxes in the Battle of Salamis.

Population, 2,375.

SAMPSON (sămp'sŭn), William T., naval officer, born in Palmyra, N. Y., Feb. 9, 1840; died May 6, 1902. He graduated from the

United States Naval Academy at Annapolis in 1861, entering the navy the same year as master, and the following year became lieutenant. In the Civil War he was on the practice ship John Adams and the monitor Palapsco, serving on the latter when it was destroyed at Charleston in 1865. During the next two



WILLIAM T. SAMPSON.

years he served in the European squadron, became commander in 1874, and was made captain in 1889. He had superintendence of the Naval Academy from 1886 to 1890, becoming commander of the San Francisco in the latter year. From 1892 until 1897 he was chief of the bureau of ordnance, and at the beginning of the Spanish-American War succeeded to the command of the North Atlantic squadron. President McKinley appointed him commodore on July 3, 1898, and, after the Battle of Santiago, fought on the latter date, made him rear admiral. On Aug. 16, 1898, he was made one of the commissioners to arrange for the Spanish evacuation of Cuba. The closing years of his life were clouded by a controversy between his friends and those of Admiral Schley, both claiming credit for the victory at Santiago.

SAMSON, one of the judges of Israel, son of Manoah, who flourished about 1116-1096 B. C. He was of the tribe of Dan, a native of Zorah, and is noted as a hero of the Israelites and an avowed enemy of the Philistines. He became a Nazarite at birth and his head remained unshorn and his lips never tasted of wine. It is recorded that he was endowed with peculiar physical power, which enabled him to tear a lion to pieces. His great strength enabled him to slay 1,000 Philistines and to carry away the gates of Gaza. He became enamored of Delilah of Sorek, to whom he imparted the secret that his physical strength was due to his hair, which had never been shorn. She soon after deprived him of this endowment by cutting off his hair, but with the growth of it his strength returned, and on the occasion of the festival of Dagon, Samson avenged himself against the Philistines, who had blinded him in the absence of his strength, by pulling down the pillars of the building in which they had assembled, but perished with them. Milton's "Samson Agonistes" is a drama that makes use of the story of Samson's death.

SAMUEL, the last judge of Israel and the first of the order of prophets. He was the son of Elkanah and Hannah, who dedicated the child

to the Lord. His training was in the sanctuary at Shiloh, under the teaching of Eli, the high priest, and while there he received the first prophetic call. Twenty years after the death of Eli he assumed the judgeship of Israel. He is credited by some writers with the authorship of the Book of Judges and a part of the books of Samuel.

SAN ANGELO, county seat of Tom Green County, Tex., 298 miles northwest of Austin, on the Concho River and on the Santa Fé and the Orient railroads. The surrounding country produces cattle, wool, sheep, and pecans. It has gas and electric plants, street railways, and large stock yards. The features include the high school, courthouse, city hall, and federal

building. Population, 1910, 10,321.

SAN ANTONIO (săn ăn-tō'nĭ-ō), a city of Texas, county seat of Bexar County, on the San Antonio River, 80 miles southwest of Austin. It has transportation facilities by the Missouri, Kansas and Texas, the Southern Pacific, the International and Great Northern, and other railroads. The location is healthful and the climate is favorable, having an elevation of about 650 feet above sea level. The streets are regularly platted, but some of the older thoroughfares are narrow. Vitrified brick, asphalt, and macadam have been used largely in constructing pavements. The streets are well lighted with gas and electricity and an extensive system of electric railways furnishes communication with urban and suburban points. Many afflicted with pul-monary diseases find the city and its vicinity favorable as a resort, and it has hot wells with distinctive curing properties.

Fort Sam Houston, located near the city, is an important army post of the United States and covers about 250 acres. Breckenridge Park, a semitropical woodland of 200 acres, borders on the San Antonio River, which flows through the city and is joined within the limits by San Pedro Creek. On the latter is San Pedro Park, a tract of 40 acres. Among the principal buildings are the county courthouse, the city hall, the Carnegie Library, and the Federal building. The educational institutions include the Santa Anna Female College, the Saint Louis College, the Saint Mary's Hall, and the Peacock's School for Boys. It has many hospitals and charitable institutions, including the Southwestern Insane Asylum, the Santa Rosa Hospital, and the Physicians' and Surgeons' Hospital. San Fernando Cathedral and Saint Mark's Cathedral are among the ecclesiastical buildings. The business and office buildings include the Southern Hotel, the Alamo National Bank, the Menger Hotel, and the Hicks Building. Many fine public and parochial schools are maintained.

San Antonio has a large wholesale trade. It is important as a shipping point of live stock, cereals, and fruits. The manufactures include malt liquors, ironware, flour and grist, cement and earthenware, machinery, tobacco products.

and clothing. An abundance of fine water is obtained from artesian wells. The sewer system has about 80 miles of mains.

San Antonio was settled by Spaniards in the latter part of the 17th century. The mission of San Antonio de Valero was founded in 1718. A colony from the Canary Islands came to the vicinity in 1831 and Texan patriots took possession of it in 1835. The following year occurred the storming of the Alamo, where the entire garrison was massacred by the Mexicans under Santa Ana. American pioneers came in large numbers after the decisive Battle of San Jacinto and many Germans settled in the vicinity after the annexation of Texas. In 1861 it was The rapid occupied by Confederate forces. growth began in 1878, when the first railroad was built into the city. Population, 1910, 96,614.

SAN BERNARDINO (běr-när-dē'nō), a city of California, county seat of San Bernardino County, 62 miles east of Los Angeles. It is on the Southern Pacific and the Atchison, Topeka and Santa Fé railroads and has urban and interurban communication by electric lines. The surrounding country is devoted to farming, fruit growing, and mining. In the vicinity are mineral baths, hence it is visited by a large number of tourists. The principal buildings include the county courthouse, the public library, the State hospital for the insane, a business college, and several fine schools and churches. Among the industries are machine shops, foundries, grain elevators, and railroad shops. It has a large trade in hay, fruits, and merchandise. A company of Mormons settled in the vicinity in 1851. It was incorporated in 1854, but declined on account of a removal of the Mormons, and it was rechartered as a city in 1863. Population, 1900, 6,150; in 1910, 12,779.

SANBORN (săn'bûrn), Franklin Benjamin, author, born at Hampton Falls, N. H., Dec. 15, 1831; died Feb. 24, 1917. He graduated at Harvard, became interested in the cause of antislavery, and in 1856 was chosen secretary of the Massachusetts-Kansas committee. From 1863 to 1868 he was secretary of the Massachusetts State Board of Charity, of which he was chairman from 1874 to 1878, and was actively interested in reforming the Tewksbury Almshouse. He was a founder of the Massachusetts infant asylum, established the Concord Summer School of Philosophy, and for some years was editorial writer for the Springfield Republican. His published works include "Life of Thoreau" and "Life and Letters of John Brown." He edited the poems of the younger W. E. Channing, Brownson Alcott's "Sonnets and Canzonettes," and William E. Channing's "Wanderer."

SAN CRISTÓBAL (krês-tō'vàl), a town of Mexico, in the state of Chiapas, about 135 miles south of the Gulf of Campeche. It is located on a plain fully 6,500 feet above the sea, and in the vicinity are ruins of ancient buildings constructed by the Indians. The principal structures in-

clude a cathedral and a number of educational institutions, such as a seminary and several academies. It has manufactures of earthenware, textiles, clothing, and utensils. Population, 1917, 15,380.

SAND, the particles of granular stone that are coarser than dust and finer than gravel. It results from the gradual disintegration of rocks under the action of water, but also from other causes, such as the detachment of particles from bowlders and pebbles under the movement of particles due to frost, wind, or water. The color of sand corresponds to that of the minerals in the rock from which it is derived. In many places vast deposits of sand form under the action of water, as along the sea coast in consequence of wave action and in streams from the effect of running water. Extensive strata of sand were formed in different geological periods, occurring at various depths and ranging in thickness from a few inches to many hundreds of feet. In many places are deposits which originate from the action of wind, as in desert regions, where the dry sand is carried and deposited in drifts or sheets. Frequently such drifts are carried into the sea, as on the western coast of North Africa. In some regions, as in Poland, the sand deposits were formed largely by the action of glaciers, while on the coasts of many islands and continents vast dunes were formed. Similar sand deposits are still forming under the action of sea waves and currents. Sea sand often contains minute fragments of shells, particles of sponges, and other remains of animal matters. Siliceous sands serve many important purposes, including the manufacture of glass and the preparation of mortar. They are used in making molds for casting, preparing filters, and improving dense clay soils for cultivation. Deposits of valuable minerals occur in many placers, such as gold, copper, tin, diamond, iron, etc.

SAND, George, eminent novelist, born in Paris, France, July 5, 1804; died June 7, 1876. She was the daughter of Lieut, Maurice Dupin, who died when she was four years of age. Her maiden name was Armantine Lucile Aurore Dupin, but she is generally known by her nom de plume, George Sand, and as Aurore Dudevant, her marriage name. After receiving an education in a convent in Paris, she was married to M. Dudevant, in 1822, but in 1831 became separated from her husband and engaged in literary work. Her first work was written in conjunction with Jules Sandeau, a lawyer of Paris, and consisted of a romance entitled "Rose et Blanche." After that many novels came from her pen and a number of them possess such literary value that she may be regarded one of the greatest of French novelists. She was associated with many leading literary men of her time, both in France and foreign countries, and to enrich her mind visited several European capitals to consult libraries and come in contact with works of art. It may be said that she was

superb as an artistic writer, devoting much of her efforts to the cause of human progress and treating her subjects in a marked purity and simplicity of language, through all of which runs a vein of practical good sense. Among her best known works are "Valentine," "André," "Indiana," "Lelia," "Leone Leoni," and "Mauprat." She published an interesting work entitled "The History of My Life."

SANDALWOOD (săn'dal-wood), the wood of any one of several trees of the sandalwood family. These trees are native to the East Indies and other islands of the tropical regions of the Pacific. Sandalwood trees are greatly branched evergreen trees, with opposite leaves and compact and fine-grained wood. They are peculiar for yielding a highly fragrant wood, from which perfume is derived, but it is used more largely for the manufacture of ornamental products, such as desks, glove boxes, and other light articles. A large number of species have been described, including the white, yellow, and red sandalwood. Most species do not grow to more than a foot in diameter. The *Indian san*dalwood trees attain a height of thirty feet and mature in twenty to thirty years. A thick, viscid oil is expressed from the seeds. It is used by the poorer classes of India for illuminating purposes. Only the heartwood is employed for sandalwood oil, from which perfume is made, but it is also used for incense and in painting sacred figures. Several species of trees native to the Hawaiian Islands yield a sandalwood which is remarkable for its fragrance and the presence of a valuable

SAND BLAST, an apparatus for propelling a jet of sand, which is utilized in engraving and cutting glass. The sand is blown by means of air or steam with great force from a tube. When the stream is directed against the article to be cut or engraved, it acts with remarkable rapidity, and as soon as the stream is turned off the article acted upon is left in a clean condition for the inspection of the workmen. The sand blast was invented by B. C. Tilghman, of Philadelphia, and is now employed largely in engraving goblets, glass household utensils, and glass globes for lamps and gas-burners. The apparatus may be used in engraving patterns on marble and metals, a paper or lace figure being placed on the surface to protect the parts that are to remain untouched.

SAND BUR, the name of a weed common to sandy regions of the Temperate zones. It is a small plant, very similar to the shorter native grasses, and locally is called *burgrass*. Small spiny burs develop in large numbers and mature early in autumn. They are injurious to live stock, especially sheep, since they become attached to the hair and wool.

SANDERLING (săn'der-ling), a class of wading birds of the snipe family, which are widely diffused in the Northern Hemisphere. birds of this species breed in the Arctic regions,

both in America and Europe, and on the approach of winter move southward as far as Brazil and Africa. Their plumage is a reddish tinge with dark markings in the spring and an ash-



gray in the winter. They are about eight inches in length, with an alar extent of thirteen inches. The nests are built under bushes, or amid weeds with a slight lining of dry grass, in which two to four

eggs are laid. They have a plaintive voice similar to the small sandpipers. Sanderlings feed on worms, small crustaceans, and tender plants. They are esteemed as a food.

SANDHURST (sănd'hûrst), or Bendigo, a city of Australia, in the State of Victoria, capital of Bendigo County, 98 miles northwest of Melbourne. It has railroad communication, being on the line between Melbourne and Sydney, and is surrounded by a farming and goldmining country. The streets are beautifully platted and improved with parkings and pave-The features include the public park, ments. the county courthouse, the public library, the city hospital, the botanical garden, and the Mechanics' Institute. Among the manufactures are machinery, earthenware, leather, clothing, spirituous liquors, vehicles, and furniture. The surrounding country is noted for its fine farms and orchards. About 5,500 miners are employed in the gold fields. The place was founded in 1851 and was chartered as a city in 1871. Population, 1916, 48,565.

SAN DIEGO (san de-a'go), a seaport city in southern California, county seat of San Diego County, on the Pacific coast. It is on the National City and Otay and the Atchison, Topeka and Santa Fé railroads and has regular communication by steamships. The harbor, situated on San Diego Bay, is deep and landlocked. In the surrounding country are extensive or-chards of tropical fruits, including oranges, olives, date palms, figs, and grapes. Two tracts of land in the vicinity are reserved by the Federal government, one for a coaling station and the other as a fortification, the latter being known as Fort Rosecrans. It has a large export and wholesaling trade in fruit and produce. Among the manufactures are tobacco products, boilers, hardware, machinery, carriages, canned fruit, flavoring extracts, wine, and leather.

San Diego has a healthful climate and is known as a summer resort. North of the city is the old town of San Diego, which is noted as the oldest in California, and a lake of boiling mud half a mile long is a short distance from

the new city. Coronado Beach, a popular summer resort, is opposite San Diego, on the south side of San Diego Bay. It has the Hotel del Coronado, an ostrich farm, and a botanical garden. Among the noteworthy buildings in San Diego are the county courthouse, the Carnegie Library, the State normal school, the Hospital of the Good Samaritan, and the Academy of Our Lady of Peace. It has many fine hotels and business blocks. Near San Diego is a fine monument to Richard A. Proctor, San Diego County is remarkable for its fertility, and ranks as the chief honey-producing region of the State. The place was occupied for the United States in 1846 by Commodore Stockton, from whom Fort Stockton was named. present charter was granted in 1889. Population, 1900, 17,700; in 1910, 39,578.

SAN DOMINGO (san do-men'go), or Santo Domingo, the capital of the San Domingo Republic, on the south shore of the island of Hayti. It is located at the mouth of the Ozama River, where it was founded by Bartholomew Columbus in 1496, and is the oldest European city in America. The streets are broad and regularly platted, intersecting each other at right angles. The harbor is spacious, has good anchorage, and is the scene of considerable trade in tobacco, fruits, cotton, and sugar. Among the principal buildings is a cathedral dating from 1540, in which the remains of Columbus were preserved from 1536 until 1794, when they were removed to Havana. Other buildings of importance include the capitol and a university. It has several hospitals, schools, and churches. San Domingo is the seat of a bishop's see and an arsenal. Population, 1916, 21,148.

SAN DOMINGO, or Dominican Republic, a government comprising the eastern part of the island of Hayti, the western part being the Republic of Hayti. It includes the larger but less populous portion of the island. The area is 18,045 square miles. Three principal mountain chains traverse San Domingo. The largest chain trends through the central part, while one lies along the northern coast, and the other chain extends from the Hayti Republic into the southwestern region. The surface is generally fertile and includes great plains and savannas, the most extensive lying in the southern part and between the central and northern mountain ranges. Among the principal rivers are the Rio de Yaque and the Youna. The coast plains are extensive, except in the northern part, and are drained by numerous small streams. The climate is generally favorable and healthful. However, the natural resources have not yet been developed to a material extent. It has considerable deposits of gold, iron, copper, salt, coal, and other minerals. Valuable forests of logwood, mahogany, pine, satinwood, fustic, and lignum vitae are abundant.

Agriculture is the principal occupation. Fully 15,500 square miles of the surface are fit for

cultivation. The principal products are sugar cane, coffee, rice, molasses, tobacco, cotton, beeswax, and fruits. It yields an abundance of fish products and domestic animals, the latter including mules, horses, cattle, and poultry. About 280 miles of railroads are open to traffic, most of which are owned or controlled by the government or by foreigners. As a general rule the highways are in a poor condition, but some of the leading thoroughfares have been well graded and macadamized. Foreign commerce is not material. The principal exports are tobacco, coffee, timber, sugar, and fruits. Among the leading imports are manufactured articles, earthenware, and clothing. Germany and the United States have the larger share of the foreign commerce.

The government is under a constitution that vests the chief administrative authority in a president. The chief executive is chosen by an electoral college for a term of four years and has the assistance of a departmental cabinet. Legislative power is vested in a congress of 24 deputies who are elected by indirect vote, in the ratio of two for each province, for the term of four years. Chief judicial authority is exercised by a supreme court of justice. The judges of the supreme court are appointed by the president, and under them is a system of courts of first instance and local justices. Spanish is the prevailing language. It has a system of public education, comprising primary and secondary schools. These schools are supplemented by a normal school and several institutions of higher learning. Attendance upon the elementary schools is free and nominally compulsory. Roman Catholicism is the state church, but other denominations are tolerated under certain restrictions. The inhabitants embrace a comparatively large per cent. of whites, but they are chiefly mulattoes, mestizos, and Negroes. San Domingo is the capital and Puerto Plata is the chief port city.

At the time Columbus discovered the island of Hayti, in 1492, it had a larger population than at present, but many of the aborigines perished under Spanish control. A formidable revolt against the Spanish took place in the 17th century, which resulted in the western part of the island being ceded to France in 1697, but the eastern part, now mainly forming the San Domingo Republic, remained a Spanish possession. A Negro revolt against France, in 1791, soon brought the entire island under the control of Toussaint L'Ouverture (q. v.), who made it an independent republic. Soon after he fell into the hands of French captors, but Dessalines drove the French out in 1803. However, he was assassinated in 1806. Insurrections and revolutions occurred at various times, but France recognized the republic in 1825, and Spain finally evacuated the island in 1865. Since then the two republics have existed with more or less change and uncertainty, disturbances

being due largely to dissatisfied and restless elements made up of people of mixed blood. Among the latest disturbances in the San Domingo Republic was a revolution in 1898, which terminated in the assassination of the president on July 26, 1899. Population, 1914, 716,509.

SANDPAPER, the commercial name of a stout paper covered with sharp sand or ground glass, which is embedded in glue. It is used for smoothing or polishing ivory, wood, bone, and other materials. The paper employed in making this product is usually of a stiff brown kind, which is covered with glue, and afterward the sand is sifted upon the glue before it is fully dry. Sandpaper is made of various sizes and different grades. The coarser material is used for less delicate work, while the finer is made of very small grains of sand and used for polishing or smoothing surfaces of a delicate kind. Emery pay r differs from sandpaper in that emery is used in the former instead of sand.

SANDPIPER (sănd'pī-pēr), an extensive group of wading birds of the snipe family. They are found in large numbers in swampy

regions, on the shores of the sea, and on the banks of rivers, lakes, and ponds. They are migratory, moving far northward in the spring. Several species migrate as far as Greenland, Spitzbergen, and Nova Zembla. The



SANDPIPER.

common species include the dunlin, red, little stint, purple, wood, ruff, green, and summer sandpipers. These birds are found in all parts of the world where water is abundant. have long legs, a long slender bill, and a short tail, and are quite active and graceful. They run and fly with rapidity, and spend much time wading in shallow water in search of food, which consists of insects, mollusks, worms, and the tender parts of plants. The purple sandpiper is the most common American species. In all species the summer plumage is different than that of winter, and they are prized for their flesh, which is both tender and well flavored. The voice is unmusical and may be heard for some distance as the bird flies through the air or runs along in the shallow water.

SANDSTONE, a class of rocks formed of particles of quartz sand cemented together with silica. Many kinds of sandstone occur in nature, varying in composition from grains of quartz scarcely visible to the naked eye to coarse formations composed of pebbles and gravel. The color differs according to the sand forming them, usually varying from gray to reddish-

brown, but in many cases there is a mixture of different colors, due to the presence of particles of mica, feldspar, granite, flint, and other substances A marked difference is observable in the consistency. Some are quite soft and porous, while others are very hard and durable. Sandstone of fine grain and uniform color is usually preferred for building purposes, while the coarser-grained species are useful in making millstones for grinding cereals. The latter kind is used for whetstones and grindstones. Vast formations of sandstone are met with in deposits of different geological ages, most of which are stratified horizontally, but in some cases they are in an inclined or vertical position. Many buildings in New York City are of the darkbrown sandstone secured in New Jersey. Deposits of sandstone of value in building occur in many sections of Canada and the United States

SANDUSKY (săn-dŭs'kĭ), a city of Ohio, county seat of Erie County, on Sandusky Bay, near Lake Erie, 55 miles west of Cleveland. Communication is furnished by steamships on the Great Lakes and by the Baltimore and Ohio, the Lake Erie and Western, the Lake Shore and Michigan Southern, and other railroads. It is beautifully situated at the mouth of the Sandusky River and has an excellent harbor. It has extensive wharves, and a large lake trade in limestone, salt, fish, wool, lime, coal, flour, cereals, and live stock. The streets are beautifully paved and intersect each other at right angles. Gas and electric lights, street railways, waterworks, and an extensive sewerage system are among the improvements. The manufactures include engines, boilers, railroad cars, machinery, spirituous liquors, edged tools, lumber products, and farming implements. Shipbuilding is an important industry.

Much of the architecture is substantial, being of brick and stone, the latter being obtained from quarries in the vicinity. The noteworthy buildings include the county courthouse, the public library, the high school, the Federal building, the county infirmary, and many fine churches. It is the seat of the Ohio Soldiers' and Sailors' Home and of the State fish hatchery. Popular summer resorts are maintained at Cedar Point and Put-in-Bay. It is one of the largest freshwater fish markets in the United States. The place was settled in 1817 and incorporated as a city in 1845. Population, 1910, 19,989.

SANDWICH ISLANDS (sănd'wich). See Hawaiian Islands.

SANDY HILL, a village of New York, in Washington County, forty miles north of Troy. It is on the Hudson River and the Delaware and Hudson Railroad. In the vicinity are lumber mills and stone quarries. The manufactures include paper, machinery, wall paper, and lumber products. It has waterworks, electric lighting, and a number of schools and churches. Population, 1905, 5,321; in 1910, 5,450.

SANDY HOOK, a peninsula extending from Monmouth County, New Jersey, to the entrance of New York harbor. It is a low and sandy point of land about nine miles long. At its northern end is the Sandy Hook lighthouse, ninety feet high, and immediately south of it are fortifications for defending the entrance to New York harbor. In connection with the government fortifications is a proving ground, at which armor plate and ordnance are tested.

SANDYS (săndz), Sir Edwin, statesman, born in Worcester, England, in 1561; died in 1629. After graduating at Oxford University, he became an active supporter of the claim of James I. to the throne and was knighted in 1603. He was a member of the Virginia Company and while holding office in that concern he instituted many reforms in the American colonies. He published "Survey of the State of Religion in the Western Parts of the World'

SAN FRANCISCO (săn frăn-sĭs'kô), the largest city on the Pacific coast of North America, in the State of California, coextensive with San Francisco County. It is situated on a peninsula lying between the Pacific and the Bay of San Francisco and on the opposite shore of the bay, due east, is the city of Oakland. San Francisco Bay is about 46 miles long from north to south, from six to ten miles wide, and north of it is San Pablo Bay, a body of water about ten miles long, which receives the discharge from the Sacramento and San Joaquin rivers through Suisun Bay. The Golden Gate, a strait five miles long and a mile wide, connects San Francisco Bay with the Pacific. Among the islands near the city are Goat, Alcatraz, and Angel islands, and in San Pablo Bay is Mare Island, which is used as a navy yard by the United States government. The shores of the bays near San Francisco are generally formed of precipitous cliffs, particularly those of the Golden Gate, and the whole region is one of remarkably picturesque scenery. Sand dunes extend along the ocean and they merge into a series of hills, which culminate in Mount San Bruno, in San Mateo County.

COMMUNICATION. The city has steamboat connections with the principal ports of the world and its harbor in San Francisco Bay takes rank with the finest in America. harbor has an area of 450 square miles. Railroad transportation is chiefly by the Southern Pacific and connecting lines, but only one of the roads enters the city, while freight and passengers are carried by ferries and steamers from Oakland, Alameda, West Berkeley, Sausalito, and other points. An extensive system of electric railways furnishes intercommunication, and cable lines are operated in the undulating and hilly sections. Many of the towns and cities in the vicinity, though organized as separate corporations, may be considered suburban, and have

been built up largely through easy communication by steamers and railway lines.

STREETS. In the older part of the city, near the water front, the streets are narrow, but they are of ample width in the newer and greater part of the municipality. The ferry depot, on the bay, is at the head of Market Street, which is the chief thoroughfare and extends in a southwesterly direction. North of it the streets are platted according to the cardinal points, but toward the south is the older part, in which the streets are more or less irregular. About 800 miles of streets have been improved for travel, a large part having been paved with bituminous rock, basaltic rock, cobblestones, and asphalt. The city is generally well lighted with gas and electricity and has extensive systems of waterworks and sewerage. Market Street contains the largest office buildings and department stores, but shopping is extensive on Post, Kearny, Geary, Sutter, and Grand avenues, and considerable shopping is carried on at Union Square and on Stockton



ENVIRONS OF SAN FRANCISCO.

Street. North of Market are the larger number of residences, while the district south has many wholesaling and manufacturing enterprises. The most fashionable quarters are on Nob Hill, which is about 300 feet above sea level and overlooks the bay and city. Pacific Heights is somewhat higher and Twin Peaks, the highest summits, are 900 feet above the sea.

PARKS. Golden Gate Park, the most beautiful in the city, extends from the western part to the ocean. It contains about 1,100 acres, about one-third of which is in greensward and the remainder is covered with beautiful flowers and trees, many of which are semitropical. Within this park is a zoölogical collection, a museum, an aviary, and numerous statues. The Presidio, a military reservation of the government, is located in the northern part, where Fort Winfield Scott overlooks the entrance to the Golden Gate. Fort Miley, Fort Barry, and Fort Baker likewise defend the entrance to San Francisco

Bay. Many small parks are located at convenient places in the city. Laurel Hill Cemetery, Calvary Cemetery, and the City Cemetery are in the northern part. The beach along the ocean is much used for bathing and at its northern end is the Cliff House. Near the latter are the noted Seal Rocks, where sea lions are frequently seen in large numbers. The chief memorials include a monument to Francis Scott Key, in Golden Gate Park; a bronze group representing the development of California, near the City Hall; and a column to commemorate the naval achievements during the war with Spain, in Union Square.

BUILDINGS. The architecture of the city is largely of modern construction, in which the steel frame and granite are prominent. Structures of this class began to be erected in 1890, when the *Chronicle* building was completed. This is a ten-story fireproof structure and withstood the earthquake of 1906. Other large buildings include the post office, the city hall, the county courthouse, the government mint,

the subtreasury, and numerous office and business blocks. Among the institutions that are housed in fine buildings are the Hopkins Art Institute, the Memorial Museum, the public library, the Mechanics' Institute, the Cooper Medical College, the College of Christian Brothers, the San Francisco State Normal School, and Saint Ignatius College. The city has many fine ecclesiastical structures, including the Roman Catholic cathedral. Besides the public library of 115,000 vol-umes may be mentioned the Mercantile Library of 75,000 volumes and the Sutro Library of 200,000 volumes. Many ward

schools and private and parochial institutions of learning are maintained.

The city has a large number of clubs and educational associations. Among the theaters are the Columbia, the Alcazar, the California, and the Grand Opera House. The Palace, the Saint Francis, and the Occidental are the leading hotels.

INDUSTRIES. San Francisco is a distinctively commercial and manufacturing city. It has a large wholesale and jobbing business, both inland and coastwise. Large quantities of coffee, tea, and sugar are imported. It is an extensive exporter of wine and brandy, wheat, salmon, fruits, lumber, and live stock. In value the exports somewhat exceed the imports, the total foreign trade averaging about \$90,500,000 per year. As a manufacturing city, San Francisco holds tenth rank in the United States. The larger interests are vested in slaughtering, meat packing, sugar refining, and shipbuilding.

Among the general manufactures are canned fruit, clothing, flour and grist, boots and shoes, leather, earthenware, cordage, machinery, furniture, glass, saddlery, and tobacco products. Among the large vessels constructed in its yards are the *Oregon* and the *Olympia*, two large battleships of the United States.

HISTORY. Franciscan friars discovered San Francisco Bay in 1718, but a permanent settlement was not made until 1776, when the mission of San Francisco de Asisi was founded. In the same year a military post was established by the Spaniards. The village of Yerba Buena took its place in 1835. At the beginning of the Mexican War, in 1846, the region was taken possession of by the United States and the name was changed to San Francisco the following year. From that time to the present the history of the city reads like a fairy tale. Many incidents of special interest are connected with the events occasioned by the discovery of gold in 1848, when people from all parts of the world gathered here and made it the center of remarkable enterprise. Destructive fires did great damage in 1849 and in 1851. The catastrophes were attended by more or less lawlessness, resulting from the coming together of large numbers who were attracted by the reports that fortunes could be made in a few days. However, these primitive conditions were soon overcome by the organization of vigilant committees, which summarily hung or imprisoned the lawless leaders.

In 1906 the city was visited by a destructive earthquake. It occurred at 5:16 o'clock on the morning of April 18, when much damage was done to many buildings and the main supply pipe of the waterworks was broken. Falling timbers and other materials caused fires to break out in many places, and a lack of water made it impossible to control the flames. For four days the fires continued, in which about 500 blocks were laid waste. Official records place the loss of lives at 427 and the loss of property at \$500,000,000. From this wreck of matter a new and more substantial city has risen, equipped with excellent systems of sewers and waterworks, and beautified by larger and more substantial architectural structures.

The inhabitants include a large number of foreign birth, of which the most numerous are the Germans, Irish, Chinese, English, and Italians, in the order named. Other nationalities include Greeks, Maltese, and Spaniards. The Chinese, though confined to their own quarters, are not as numerous as they were in 1890, when they numbered 25,833, which is about twice the present number. Population, 1910, 416,912.

SAN FRANCISCO. See São Francisco. SAN GERMÁN (sän hēr-mān'), a city of Porto Rico, in the province of Mayaguez, about eight miles southeast of the city of Mayaguez. It is situated near the Rio Grande and has large commercial and manufacturing interests.

In the vicinity are valuable forests and plantations. The first settlement was made here by the Spanish in 1543. Population, 1918, 4,368.

SANGIR ISLANDS (sāṇ-ṣēr'), an island group of Malaysia, situated between Celebes and the Philippines. The area is 408 square miles. It is a possession of Holland. The group comprises many small islands, of which Great Sangir is the largest, having a length of thirty miles and an average width of ten miles. The islands are of volcanic origin and contain a number of active volcanoes, of which Abu, on Great Sangir, is the most important. This volcano was in a state of active eruption in 1856, when 2,850 persons perished. Most of the islands are inhabited and have a fertile soil, producing cocoa palms, fruits, hemp, timber, rice, sago, and tobacco Population, 1916, 114,876.

SANHEDRIM (săn'hē-drĭm), a council and tribunal of the Jews. It is thought to date from the time of the Maccabees and probably was established under John Hyrcanus. Some writers trace its origin to the seventy elders appointed by Moses, but this view is not supported by the early Greek writers. In the later period there were several sanhedrims, of which the Great Sanhedrim was the supreme authority. It was composed of 71 priests, scribes, and elders of the people. At the time of the Romans it was presided over by the high priest. The members sat in a crescent, the high priest occupying a seat in the middle higher than the rest. He was supported on the right by the father of the council, called the Ab-beth-din, and on the left by a learned referee. It originally had power of life and death, but this it ultimately lost. Herod was summoned before the sanhedrim in 47 B. c. for putting people to death, and Jesus was condemned by it for claiming to be the Messiah. It ended in 425 A. D., when Theodosius put the last president to death. The lesser sanhedrims, or provincial courts, of which there was one in each large town, were composed of 23 members appointed by the Great Sanhedrim in the city of Jerusalem.

SANITARY SCIENCE (săn'i-tā-ry), the branch of study relating to the preservation of health and prevention of disease, both as to communities and individuals. This science is not only concerned with the mission of teaching the correct mode of life to individuals, but in an enlarged sense embraces the study of the methods of preventing disease and preserving bodily functions by means of supplying the most serviceable and wholesome dwellings, food, and clothing that may be obtained. It is essential that dwellings and public buildings be constructed in conformity with plans so devised that the most wholesome means of obtaining ample light and ventilation may be secured, and that the drainage be adequate to the highest needs. With this end in view many cities have placed the supervision of buildings in a state of construction under a competent director,

especially with the design that sewerage, drainage, light, and water connections be provided for properly. Within late years growing concern has been manifested in the matter of overcrowded dwellings in cities, in which diseases of an epidemic character often originate, with a view to guard against unwholesome gases generating from the waste of organic and other refuse matters.

Legislators, both in the nation and in the states, have directed their attention with a view of providing safeguards against impure and unwholesome food, which in many cases is put on the market to enhance profits, but which result in injury to health and life. As a general rule it is recommended that all dwellings be provided with ample bathing facilities and an adequate supply of pure water, thus enabling the occupants to take such baths as are needed to insure ample cleanliness, and to flush closets for the purpose of removing waste and impurities with speed and effect. Plenty of outdoor exercise is recommended as a prolific source of physical strength. The practice of virtues and freedom from anxiety have a wholesome influence in promoting and preserving health. In many countries it is necessary to secure the approval of the government board of health of plans for new water-supply and sewer systems that are proposed in the large cities. However, in general, the states of the United States and the provinces of Canada extend to cities the power to regulate the sanitation within their territory. This has resulted in marked improvements in the larger cities, where public super vision is operating to overcome to a large extent the conditions that are injurious to health.

In 1861 the United States Sanitary Commission was organized by New England women for the relief and comfort of Union soldiers during the Civil War, in the camp and field. organization was designed to supplement the army medical bureau. It rendered very efficient service in improving the clothing, ventilation, cookery, and drainage. This work is regarded one of the most perfect exemplifications of charity, and it may be said that much of the suffering and bitterness incident to war were dissipated by the prompt work of the association. Besides distributing many supplies to the soldiers and sailors, it established hospitals and homes at recruiting points, and provided hospital steamers and cars for wounded and sick soldiers. The affairs were managed by a board of 25 commissioners, of which Henry Bellows, of New York, was president. The commission received, from its organization to the surrender of its charter, money amounting to about \$6,000,000 and goods valued at about \$15,000,-000, all of which it distributed at points most in need of assistance. See Hygiene.

SAN JACINTO (san ja-sin'tô), Battle of, the closing battle of the war for independence

of Texas, which took place near the town of San Jacinto, Tex., April 21, 1836. The Texan army of 783 men under General Houston was attacked by 1,536 Mexicans under Santa Anna and, after a desperate struggle of an hour, in which the Mexicans lost about 600 men, the latter surrendered. The independence of Texas was favored by the United States government, and many of Houston's soldiers had been openly enlisted in New Orleans.

SAN JOAQUIN (sän wä-kēn'), a river of California, which rises in the Sierra Nevada Mountains and, after a general course of 350 miles toward the northwest, joins the Sacramento at its entrance into Suisun Bay. It receives the water from Tulare Lake by the Kings River. Another tributary, the Merced, drains the famous Yosemite Valley. The San Joaquin valley is a large part of the fertile region of central California and produces vast quantities of cereals, grasses, and fruits.

SAN JOSÉ (hô-zā'), a city of California, county seat of Santa Clara County, fifty miles southeast of San Francisco. It is on the Central Pacific and the Southern Pacific railroads. The site is on a plateau between the Coyote and Guadalupe rivers, two small streams flowing into San Francisco Bay, which is about six miles from San José. It has a beautiful climate and is surrounded by a fertile fruit and farming country. The manufactures include leather, flour, canned fruits, wine, woolen goods, lumber products, and machinery.

Among the principal buildings are the county courthouse, the public library, the post office building, the high school, the State asylum for the insane, the State normal school, and the Academy of Notre Dame. Near it is the Lick Observatory. It is the seat of the University of the Pacific, a Methodist Episcopal institution. The city has gas and electric lighting, sanitary sewerage, public waterworks, and electric street railroads. It was founded in 1777 and a mission was established here in 1797. A small military force captured it for the United States in 1846. From 1849 to 1851 it was the capital of California. Population, 1900, 21,500; in 1910, 28,946.

SAN JOSE, the capital of Costa Rica, Central America, situated near the center of the state, on an elevated and fertile plain 3,775 feet above sea level. It is connected by railway with the coasts of the Caribbean Sea and Pacific Ocean, Limón being the terminus on the former and Punta Arenas on the latter. The principal buildings include a cathedral, the bishop's palace, the government buildings, and a university. Most of the streets are narrow, but within recent years notable improvements have been made and its trade has been enlarged materially. The city has a public school system, a medical college, a museum, and a number of parks. San José has been the capital of Costa Rica since 1823, in which year it was removed from Cartago. Population, 30,130.

SAN JUAN (hoo-an'), the capital of Porto Rico, situated on a peninsula on the north side of the Gulf of San Juan. It has one of the finest harbors in the West Indies, and is the seat of an extensive trade in native products and imports. Railroad connections afford adequate communication with the interior. It has many important steamship and submerged telegraph lines. The streets are improved by electric lighting, stone and macadam pavements, and rapid transit. Among the manufactures are sugar, tobacco products, clothing, soap, spirituous liquors, utensils, and machinery. The noteworthy buildings include the city hall, the government building, the theater, the public library, the military hospital, the cathedral, and the Jesuit College. A statue of Ponce de León is located on the Plaza de Santiago. Morro Castle, built in 1584, is situated on a promontory in the western part of the city. The city was founded in 1521 by Ponce de León. It was bombarded by the Dutch in 1625 and in 1898 it became a possession of the United

States. Population, 1910. 48,716.

SAN JUAN, a river of Central America, which is important because of its location on the route of the proposed Nicaragua Canal. It is the outlet of Lake Nicaragua and flows toward the south and east for about two-thirds of its length, when it makes a bold turn toward the northeast and enters the Caribbean Sea a short distance south of Greytown. The entire length is about 115 miles, but only about one-half of its lower course is serviceable in the canal. In 1529 Diego Machuca sailed down the river from Nicaragua Lake, this being the first

time that it was navigated.

SAN JUAN ISLANDS, an archipelago in the Gulf of Georgia, lying between the mainland and Vancouver Island. They constitute San Juan County, in the State of Washington. The principal islands are San Juan and Orcas. Friday Harbor is the chief town and county seat. They were a source of dispute between the United States and Canada for some time after concluding the treaty of 1846. The United States contended that the boundary extends through the middle of the Canal de Haro, which separates the islands from Vancouver Island, while Great Britain maintained that the boundary is through Rosario Strait. In 1871 the controversy was referred to the Emperor of Germany, who rendered a decision in favor of the United States.

SANKEY (săn'ki), Ira David, evangelist, born in Edinburg, Pa., Aug. 28, 1840; died Aug. 13, 1908. His father, David Sankey, was an editor and banker and for many years held the office of State senator. At an early age he displayed much fondness for music. In 1855 he became leader of the Methodist Church choir in Newcastle, Pa., of which he was a member. He attended a convention of the Young Men's Christian Association at Indianapolis, in 1870.

where he met Dwight L. Moody and joined him in his evangelical work. His voice being a fine baritone, he became prominent as a valuable auxiliary to the evangelical work of Moody. In the later years of his life he became almost totally blind. He published "Sacred Songs and Solos," "Gospel Hymns," and "Winnowed Songs for Sunday Schools." His best known songs include "Throw Out the Life Line," "Pull for the Shore, Sailor," and "The Ninety and Nine."

SAN LUIS OBISPO, county seat of San Luis Obispo County, Cal., 145 miles northwest of Los Angeles, on the Southern Pacific and other railroads. The surrounding country produces live stock, cereals, and dairy products. It has a large trade. The features include the courthouse, high school, and public library. It was settled in 1772. Population, 1910, 5,157.

SAN LUIS POTOSI (san loo-es' pō-tō-se'), a city of Mexico, capital of a state of the same name, 360 miles northwest of the City of Mexico. The site is on a fertile tableland 6,375 feet above sea level. In the vicinity are productive gold and silver mines and large smelting works are located here. It was founded in 1586, but its prosperity is due largely to the mines and raılroad traffic. It is the seat of a University. Population, 1910, 82,946.

SAN MARINO (mä-re'nō), an independent republic in Europe, situated on the eastern slope of the Apennines, about forty miles southeast of Ravenna, Italy. It is entirely encircled by provinces formerly belonging to the papal states, but which are now included in Italy. The area is 38 square miles. It is a hilly district, the highest point, Monte Titano, being 2,650 feet above the sea. The climate is healthful, but the country is somewhat windy and subject to frequent rains. Farming, fruit culture, and stock breeding are the principal occupations. San Marino is the capital. It is reached only by a wagon road and has narrow streets. A museum, several government buildings, and five churches are among the noteworthy structures.

The government is by a grand council of sixty members, of whom twenty are nobles; twenty, burgesses; and twenty, rural landowners, who are selected by the grand council and serve for life. The executive authority is vested in two captain regents, who are chosen by the grand council and each holds office for six months. The army consists of 950 men. San Marino was recognized as an independent republic by the Pope in 1631, and ever since its independence has been guarded with remarkable zeal by the inhabitants. In 1862 it placed itself under the protection of Italy. Population, 1906, 11,439; in 1910, 10,489.

SAN MARTIN (sän mär-ten'), José de, soldier, born at Yapeyu, Argentina, Feb. 25, 1778; died Aug. 17, 1850. He studied in Spain and served in the army against France. In 1811 he went over to the Revolutionists and

sailed for Buenos Ayres, where he was made commander of a regiment of cavalry. He defeated the Spanish at San Lorenzo and in 1814 commanded the insurgent army of Peru. In 1818 he joined the movement for independence in Chile, where a republic was established, and in 1821 took part in proclaiming the independence of Peru. The following year he resigned his command and sailed to Europe, after which the task of conquering the country was left to Bolivar.

SAN MICHELI (sän me-kå'le), Michele, architect, born in Verona, Italy, 1484; died in 1559. He worked in Rome, where he met Michel Angelo. The Pompeii Palace in Verona is his

masterpiece.

SAN RAFAEL, capital of Marion County, Cal., 15 miles north of San Francisco, on San Pablo Strait and on the Northwestern Pacific Railroad. It has creameries, printing offices, and a Dominican convent. The features include the courthouse, high school, and public library. It was settled in 1840. Population, 1910, 5,934.

SAN SALVADOR (säl-vå-dör'), a city of Central America, capital of the republic of Salvador, located 105 miles southeast of Guatemala. It is situated in the center of a rich farming country and has a large inland trade, but its architecture is mostly of wood and brick. The most noted buildings include the national palace, a normal school, a university, a cathedral, and the national theater. Near the city is the extinct volcano of San Salvador, height 8,365 feet. It has a large trade in grain, sugar, tobacco, and indigo. The Spaniards founded the city in 1528. In 1854 it had many splendid buildings, but on April 6 of that year a destructive earthquake completely destroyed it. Soon after it was rebuilt. Several of the new buildings are fine structures. Population, 1918, 59,568.

sans-culotte (sănz-kû-lŏt'), a word meaning without breeches. It was applied in France by the court party at the outbreak of the Revolution to the advocates of democratic principles. This designation first arose from the circumstance that the Revolutionists adopted the use of trousers or pantaloons instead of the knee breeches then in fashion, and was applied in a spirit of reproach. The advocates of democracy soon turned the term to good use, applying it to themselves as patriots, and it was long a distinction between them and the court party, but toward the close of the convention fell into disuse.

SANSKRIT (săn'skrit), the oldest of the Aryan or Indo-European languages. It bears the same relation to the Aryan languages that Latin does to the Romance tongues. Sanskrit is still cultivated as a classical language and is the sacred language of the Brahmans. There is a resemblance between it and the Greek in that both are highly inflected. However, it holds a higher rank of value to philologists, since philology did not assume the importance of a science

until Sanskrit became known to the Europeans. The word Sanskrit is applied only to the symmetrically formed language preserved in the classical and sacred writings of the Hindus, the word meaning carefully constructed. In this sense it stands opposed to Prakrit; that is, natural or common, the Sanskrit dialect spoken by the unlearned people, such as women and servants, in the Sanskrit dramas. The Prakrit is a branch of the southern division of Aryan languages and is the source of the vernaculars of modern India. It is thought that the Sanskrit never attained a wide use among the common people, but in its purity constituted the written and spoken form among the educated classes.

The Sanskrit alphabet has 14 vowels and diphthongs and 33 consonants, but to these are added several secondary characters. Among the peculiarities in Sanskrit grammar are its limited use of prepositions to govern nouns, but instead they occur as prefixes of verbs. Three genders are recognized, the masculine, feminine, and common; and three numbers, the singular, dual, and plural. The eight cases include nominative, accusative, instrumental, dative, ablative, locative, genitive, and vocative. Writers recognize a peculiar resemblance between it and the Greek, both languages being highly inflected, and there is a similarity in the forms of the verbs. Two distinct periods are recognized in the history of Sanskrit. The first epoch represents the use of the language as contained in the Vedic hymns, and the other embraces its use in the epic writings, the laws, and other later literature.

Literature. Sanskrit literature is made up of a large number of writings, the most important of which are of a religious character. It may be said that the literature begins with the Vedas and dates probably from 2000 to 1500 B. C. Four collections are included in the Vedic writings, which are looked upon as the source from which all sacred writings of the Hindus were drawn. These collections include the large work called Rig-Veda, the collection of verses known as Sama-Veda, the verses or sacrifices known as Yujur-Veda, and the edition known as Atharva-Veda. A later work or treatise relating to religious practice is called Puranas. The law literature is of next importance, including a treatise on religious and civil law known as Dharma-Shastra, which embraces additions relating to education, marriage, funeral rites, and the duties of teachers and officers. In the writings classed as epics are a number of interesting works, but the most important include the Rámáyana and the Mahábhárata. The latter is a work of 220,000 lines and may be said to be the production of writers who flourished in different periods. It contains epic and lyric poems, mythical history, and philosophical investigations. The Rámáyana embraces an account of Rama, a prince of Oude, whose heroic conquest of the Deccan and Ceylon is recounted.

The dramatic writings of the Hindus are inferior, when considered on a comparative basis with their works in other lines, which is partly due to the use of Prakrit when representing females and the lower characters, while the highest form of Sanskrit is employed in presenting the higher male characters. These writings are rich in fables, including the earlier collection known as Panchatantra and the later group of writings known as Hitopadesha. Many of these fables became current in the literature of all the Eastern peoples, and even reached a wide use among the people of Europe in the Middle Ages. Their works in history, music, anatomy, medicine, and architecture take a more or less important rank. It is particularly noteworthy that their writings in astronomy and arithmetic are of a high character, and include a treatise on the solar year, which they divided into 365 days. Their astronomer, Aryabhatta, affirmed the revolution of the earth on its axis, gave the true theory of the causes of solar and lunar eclipses, and observed the motion of the equinoxes and solstices.

In lexicography the Aryans had a number of works that embrace commentaries on words and trace many of them from their roots. Precision of language was a peculiar characteristic of their writers, which is evidenced by numerous works on grammar and prosody. The oldest work on Sanskrit grammar dates from the 3d century B. C., and is assigned to a writer named Panini. Many literary productions and treatises in the Sanskrit emanated from Buddhist and Brahman writers of recent date, though these writers employed modern forms of the language. It is made certain by inscriptions that Sanskrit in its purity ceased to be a spoken tongue at least 200 years before the Christian era.

SANTA ANA, capital of Orange County, Cal., 30 miles south of Los Angeles, on the Southern Pacific and other railroads. The surrounding country produces fruit and dairy products. It has a fine courthouse, high school, and public library. The place was settled in 1870 and incorporated in 1888. Population, 1910, 8,429.

SANTA ANA (sān'tā ā'nà), a city of Central America, in Salvador, near the Santa Ana River, capital of the department of Santa Ana. It has railroad connection with Acajutla, its seaport on the Pacific. It has a large trade in sugar, cereals, and fruits. The volcano of Santa Ana is ten miles southwest of the city; height, 6,625 feet. Population, 1912, 49,250.

SANTA ANNA, or Santa Ana, Antonio Lopez de, soldier and statesman, born in Jalapa, Mexico, Feb. 21, 1795; died June 20, 1876. He entered the Spanish army in 1810 and by 1821 attained the rank of lieutenant colonel, but in the same year he joined the revolutionary forces under General Iturbide, who made him governor of Vera Cruz with the military rank of brigadier general. The Spanish forces were driven from his territory and, when Emperor

Iturbide's government became oppressive, in 1822, he declared a republic, which every government except Spain recognized. The aristocratic faction incited a number of quarrels that caused

a civil war. Santa Anna not only quelled the disturbances with vigor, but defeated a body of Spanish soldiers at Tampico, and in 1832 became president of the republic.

His government adopted the policy of concentrating



GENERAL SANTA ANNA

power in the nation at the expense of the states, making the latter largely tributary, and in consequence Texas rebelled in 1836. Though at first highly successful in the war against Texas, he was finally defeated at San Jacinto by General Houston and was captured. Soon after his release Mexico was invaded by French troops, which landed at Vera Cruz in 1837, but Santa Anna charged them with great bravery and drove the invaders from the country. He was wounded in the left leg at Vera Cruz, which made it necessary to amputate the limb. In 1841 another revolution occurred, and he was appointed by the junta provisional president, serving in that capacity until 1845, when he was obliged to seek safety at Havana as an exile.

The war with the United States began in 1846. After the defeat of the Mexicans at Palo Alto, Resaca de la Palma, and Monterey, Santa Anna was recalled to take charge of the army and was made president. Soon after the defeat of Buena Vista and Cerro Gordo, it became certain that the capital would be captured and Santa Anna resigned the presidency and retired from Mexico. He was recalled in 1853 and made president, but was compelled to leave two years later and, when Maximilian became emperor, he returned under a written promise of loyalty to the empire. His intrigues to arouse the people against the government caused the emperor to order him from the country, when he took up his residence in the United States, but returned to Mexico in 1867 to make his final effort to secure control of the government. However, he was captured before landing at Vera Cruz and condemned to death, but President Juarez pardoned him on condition that he would leave the country. His residence was on Staten Island, New York, until 1875, when he returned to his native country. Santa Anna is regarded one of the ablest of Mexican generals and quelled civil wars with considerable success. Charles III.

of Spain conferred upon him the Grand Cross, and the King of Prussia presented him the Cross of the Red Eagle.

SANTA BARBARA (săn'tà bar'ba-ra), a city in California, county seat of Santa Barbara County, on the Pacific coast, ninety miles northwest of Los Angeles. It is on the Southern Pacific and the California Northwestern railroads. The surrounding country produces grain, fruit, vegetables, and flowers. It is frequently called the "Newport of the Pacific," owing to its fine climate and picturesque loca-The noteworthy buildings include the tion. Potter Hotel, the public library, the county courthouse, the Anthony's College, the Blake Sanatorium, and the Saint Vincent's School. Among the manufactures are flour, beet sugar, canned fruits, earthenware, and machinery. It is lighted by gas and electricity, has street pavements, waterworks, and other municipal facilities. A mission was founded on the site of Santa Barbara, in 1780. It was incorporated as a city in 1874. Population, 1910, 11,659.

SANTA CLAUS (săn'tà klaz), the name of a friend of children, who, according to folklore, brings presents on Christmas eve. He is usually represented as an aged but jolly man who drives over the roads in a sleigh drawn by reindeer, and descends chimneys to fill with gifts the stockings hung up to receive them. It is said that he sometimes leaves a birch rod in the stocking of a naughty child. The name Santa Claus was derived from Saint Nicholas, the patron saint of children, and is of German origin, but the legend was first brought to America by Dutch settlers of New York. The feast was celebrated originally on Dec. 6 and that day is still observed in some parts of Germany, but it is now held generally on Christmas

SANTA CRUZ (kroos), a city of California, county seat of Santa Cruz County, on Monterey Bay, 72 miles southeast of San Francisco. It is on the Southern Pacific Railroad, at the mouth of the San Lorenzo River, and has steamship communication. The surrounding country is noted for the production of cereals, live stock, and fruits. In the vicinity are deposits of bitumen. Among the features are the county courthouse, the public high school, the city library, the public park, and the School of the Holy Cross. The chief manufactures include canned fruits, gunpowder, leather, paper, flour, lime, lumber products, and machinery. It has a fine beach for bathing, public waterworks, and systems of public lighting and sewerage. Franciscan monks founded a mission here in 1782. It was incorporated in 1874. Population, 1900, 5,659; in 1910, 11,146.

SANTA CRUZ, the capital and chief port of the Canary Islands, on the northeast coast of Teneriffe. The harbor is the best in the Canary group, being protected by two moles, and furnishes safe anchorage for a large number of ships. The streets are broad and regularly platted, but most of the buildings have flat roofs. It has a large import and export trade and manufactures of wine, cochineal, and utensils. The city is defended by several forts. Population, 1910, 53,403.

SANTA CRUZ, a city of Bolivia, capital of the department of Santa Cruz, about 165 miles northeast of Sucre. It is situated in the valley of the Mamore River and is surrounded by a fertile country. In the vicinity are vast forests. Many of the buildings are of timber, but some are of stone and brick. It has a growing inland trade. Population, 1916, 15,988

SANTA FÉ (fä) the capital of New Mexico, county seat of Santa Fé County, on the western slopes of the Rocky Mountains, about twenty miles east of the Rio Grande. Communication is furnished by the Denver and Rio Grande and the Atchison, Topeka and Santa Fé railroads. It occupies a fine site 6,825 feet above sea level, within sight of the foothills of the Rocky Mountains, and has a pleasant and healthful climate. The former town of low houses and narrow streets has given way to a new city with modern facilities. It has an extensive and growing trade and in its vicinity are valuable mines of gold, silver, zinc, lead, and copper. The climate is arid, thus making irrigation necessary for successful cultivation, but this means has been taken advantage of and many fine farms, orchards, and gardens are the result.

Santa Fé has a fine public school system and is the seat of a hospital, an orphan asylum, the Saint Michael's College, and the Romona School for Indian Girls. Other noteworthy buildings include the Federal building, the capitol, the penitentiary, the Cathedral of San Francisco, the Church of San Miguel, and the Loretto Convent. It has electric lighting, waterworks and sanitary sewerage.

The region was first visited by the Spaniards in 1542, when it contained an Indian town. Santa Fé was founded in 1605 and is one of the oldest cities in America. It became the capital of New Mexico in 1640, but was captured and burned by the Indians in 1680 and was recaptured in 1694. An American army under General Kearny occupied it in 1846. In 1851 it became the capital of New Mexico. It was held by the Confederates for a short time in 1862. The place was chartered as a city in 1890. Population, 1900, 5,603; in 1910, 5,072.

SANTA FÉ, a city of Argentina, capital of the province of Santa Fé, 230 miles northwest of Buenos Ayres. It occupies a low site at the junction of the Salado and Paraná rivers. The surrounding country produces fruits and cereals. It has an important railroad and river trade in timber, hides, and cereals. Shipbuilding is the principal industry. Among the manufactures are tile, macaroni, oil, clothing, and machinery. It has a Catholic cathedral, a Jesuits' college.

and several schools. The place was founded in 1573. Population, 1917, 33,845.

SANTA MAURA. See Leucadia.

SANTANDER (sän-tan-dâr'), a seaport city of northern Spain, capital of the province of Santander, on the Bay of Biscay. It has an excellent harbor, extensive steamboat and railroad facilities, and is the center of a large trade in cereals, fruits, live stock, and merchandise. Among the manufactures are sailcloth, chemicals, tobacco products, cured fish, leather, sugar, clothing, and machinery. The city is well built and is improved by numerous municipal facilities. It has waterworks, electric lighting, a cathedral, several parks, and a number of schools. Population, 1910, 65,209.

SANTA ROSA (ro'zà), a city in California, county seat of Sonoma County, 52 miles north of San Francisco, on the California Northwestern and the Southern Pacific railroads. It occupies a fine site on Santa Rosa Creek, has wide and well-graded streets, and is the center of a large trade in roses and nursery stock. The surrounding country produces fruits, cereals, and dairy products. Among the noteworthy buildings are the county courthouse, the public library, the Pacific Methodist College, the Ursuline Academy, and the Santa Rosa College for Ladies. The manufactures include wine, leather, canned fruit, cigars, flour, and machinery. It has systems of public waterworks, sewerage, and electric lighting. The place was settled in 1850 and incorporated in 1854. Population, 1900, 6,673; in 1910, 7,817.

SANTIAGO (sän-tē-ä'gō), the capital and largest city of Chile, in the province of Santiago, 90 miles southeast of Valparaiso. It occupies a fine site on the Mapocho River, which is elevated about 1,650 feet above sea level, but its buildings are mostly low, owing to occasional disturbances by earthquakes. The streets are regularly platted, intersecting each other at right angles. In the center of the city is the Plaza Independencia, a large square adorned with beautiful plants and a fine fountain. Around the square are the most important buildings, including a cathedral, the government building, and an archbishop's palace. Other structures of note include the mint, the cathedral, the opera house, the Exposition Palace, the University of Santiago, the national institute of secondary education, a musical conservatory, and a military school. The university has a fine museum, a library, and botanical gardens. It is attended by 1,000 students. The national library, founded in 1813, contains 75,000 volumes, including many valuable works relating to America. It has many academies, convents, and scientific and educational associations.

Santiago is surrounded by a district which has fine orchards of figs and other fruits and contains deposits of gold, silver, lead, and other minerals. Among the manufactures are wines, clothing, earthenware, furniture, machinery, and

tobacco products. The city has railroad connections with other trade emporiums. It is lighted by gas and electricity and has electric street railways, waterworks, pavements, sewerage, and a fine public park. The larger part of the trade is in the hands of foreigners and the commerce is largely through Valparaiso, its port on the Pacific. Pedro de Valdivia founded Santiago in 1541. In 1906 it was visited by a destructive earthquake, which caused much loss of life and destroyed property valued at \$10,000,000. Population, 1917, 378.462.

SANTIAGO, Battle of, a naval engagement of the Spanish-American War, which occurred on July 3, 1898, off the coast of Cuba. The American squadron was under command of Sampson and Schley, who had confined the Spanish squadron, commanded by Cevera, in the harbor of Santiago de Cuba. Lieutenant Hobson had previously sunk the collier Merrimac in the narrow channel to the harbor and the American army was completing the investment of the city. Cevera made a bold dash to escape on the morning of July 3, but was immediately attacked and pursued by the Americans under Schley. The fighting continued most of the day, but the Spanish lost 510 men killed and wounded and all of their vessels. One American was killed and ten were wounded.

SANTIAGO DE CUBA (koo'va), a seaport city of Cuba, on the Bay of Santiago de Cuba, capital of a province of the same name, in the southeastern part of the island. It has steamboat and railroad facilities and a welldefended harbor, which is accessible by the largest vessels. The city occupies a fine site largest vessels. on a hillside 150 feet above the bay. It has paved streets, electric and gas lighting, waterworks, rapid transit, and other municipal improvements. The noteworthy buildings include the government palace, the military hospital, the opera house, the cathedral, and the Hospital de Cardidad. Calle de Christina, extending along the water front, is the chief street. Nearly all the larger buildings face the Plaza de Armas, which contains beautiful trees and subtropical plants.

The city has a large trade and many industries. Among the manufactures are sugar, soap, leather, tobacco and cigars, spirituous liquors, lumber products, and machinery. In the vicinity are extensive copper mines and numerous orchards, vineyards, and tobacco and sugar plantations. It was founded in 1514 and is the oldest town of Cuba. For many years it was the capital city. On July 3, 1898, the American fleet destroyed the Spanish squadron near Santiago. The city was defended by a Spanish force under General Toral, but capitulated and was occupied by American troops on July 17 of the same year. Population, 1911, 58,544.

SANTO DOMINGO. See San Domingo. SANTOS (san'tosh), a seaport city of

Brazil, in the state of São Paulo, 25 miles south of the city of São Paulo, with which it is connected by a railway. The streets are well graded and paved, mostly with macadam, and it has a number of fine parks and boulevards. It has a spacious harbor and a large trade in coffee, wheat, sugar, and fruits. As a coffee-exporting port it takes rank among the most important in the world. Electric and gas lighting, waterworks, and a public library are among the utilities. It has manufactures of clothing, utensils, tobacco products, and machinery. The place was founded in 1539. Population, 1916, 41,084.

SANTOS-DUMONT, Albert, aëronaut, born in São Paulo, Brazil, July 20, 1873. His father, a wealthy coffee planter, gave him the advantage of a careful education. After attending several institutions in Rio de Janeiro, he spent two years in Europe, where he acquired proficiency in the use of French and English. He visited the United States in 1894 and soon after turned his attention to aëronautics. Besides making a number of memorable ascensions, he experimented with a dirigible balloon. In 1901 he was awarded a cash prize of £10,000, which had been offered by M. Henri Deutsch to the first aëronaut who would make a voyage around Eiffel tower. His experiments at the Louisiana Purchase Exposition in 1904 with the dirigible balloon were not entirely satisfactory, but he made a number of successful ascensions and long voyages both before and since. In 1904 he published "My Airships: A Story of My Life."

SÃO FRANCISCO (soun fran-sēsh'koo), a river of eastern Brazil, which rises in the province of Minas Geraes. It has a general northeasterly course to Quebrobo, where it assumes a course toward the southeast and flows into the Atlantic. It flows through a large part of the Brazilian Highlands and in its upper regions are the celebrated Brazilian diamond fields. The entire length is 1,750 miles. It is navigable for large vessels to the Falls of Paulo Affonso, a distance of 140 miles from its mouth. These falls are 275 feet high and may be classed among the most remarkable of America. The river is navigable for 900 miles above the falls.

SAÔNE (sōn), a river in the eastern part of France, the largest tributary of the Rhone. It rises in the department of Vosges and joins the Rhone at Lyons, after a course of 290 miles. The chief tributaries are the Ognon and the Doubs. Canals connect it with the Moselle, the Loire, the Rhine, and the Seine. It is navigable for a distance of 190 miles.

SAO PAULO (soun pou'loo), a city of Brazil, capital of a state of the same name, 250 miles southwest of Rio de Janeiro. It occupies a fine site on a plain near the source of the Rio Tiete, a tributary of the Rio Paranahiba. The surrounding country is noted for its fertility and has fine forests and deposits of precious metals and gems. It has a large trade in coffee, live

stock, tobacco, sugar, rice, millet, and dairy products. The manufactures include furniture, cotton and woolen goods, leather, vehicles, soap, utensils, and machinery. Among the important buildings are the Ypiranga Palace, the government house, the cathedral, the Jesuit College, and many parochial schools. The state of São Paulo is colonized largely by Europeans, including many Germans and Italians. The city was founded by Jesuits in 1552. Population, 1917, 502,436.

SAP, the liquid found in growing plants, which serves functions in plant life as important as blood does in animals. In it take place the changes necessary for vegetable growth. It is formed by the roots as crude sap from materials taken up from the soil. After passing from cell to cell by a process known as endosmose, it ascends to the leaves. There it undergoes chemical changes through the influence of light, especially the absorption of carbon dioxide from the air and the formation of sap elements. It now takes the name of elaborated sap and descends mainly through the bark, forming on its downward course the new growth to build up the plant. The ascent is with great rapidity in a zigzag course, but it is most copious in the spring, while at the beginning of winter it ceases entirely. The movement of sap in trees is one of the early signs of the return of spring in temperate and cold zones. Many plants yield sap that is of value in medicine and the industries, such as the maple, the beet, and the sugar cane, which furnish the world's supply of sugar.

SAPAJOU (săp'â-joō), or Sajou, the name given to a group of monkeys native to America, which includes the largest and most intelligent species. They have a prehensile tail, the under surface of which is naked. The color is light brown, but the forehead is white. They live in bands, frequently from 40 to 50, and are able to leap long distances in passing from tree to tree. The largest are 45 inches long, including the tail, which is 20 inches. Their food consists of fruits, insects, and the tender shoots of plants.

SAPPHIRE (săf'îr), a precious stone of the corundum kind, next in value and hardness to the diamond. The ruby is a reddish-colored stone of the same kind, while the sapphire is a transparent species of a blue color, but there are sapphires of variegated colors. The topaz is a yellow sapphire, the amethyst is a violet, and the emerald is a green. Other species are colorless, striped, or milky. Sapphire occurs crystallized in six-sided prisms, with six-sided pyramidal ends. The most valuable specimens are produced in Ceylon, Bohemia, Burmah, and Persia. Several species are obtained in the United States, Germany, and Australia. The value of sapphires depends upon the color and transparency.

SAPPHO (săf'fô), eminent Greek poetess, born at Mitylene, on the island of Lesbos, and lived about 600 B. C. Few events of her life have

passed down in history, but it is generally thought that her father died when she was six vears old. Grecian literature makes it certain that she lived at the same time that Alcaeus,



SAPPHO

Pittacus, and Stesichorus flourished. She resided as a refugee in Sicily from 604 to 592 в. с., where she practiced the art of poetry and attracted the attention of many female pupils. After returning to Mitylene, she became the center of a coterie made up of females who had been her students in fashion and poetry.

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Her writings consist chiefly of songs of love. She is placed by Aristotle in the same rank with Homer. Plato spoke of her as the tenth Muse. It is said that one of her poems so affected Solon that he prayed the gods to preserve his life until he had found time to commit it to memory. Her writings were intended to elevate her countrywomen, and all of them were remarkable for their intense and brilliant style and beauty of imagery. Only two of her odes are extant, one of which is a beautiful poem devoted to Venus, the goddess of love and beauty.

SARACEN (săr'à-sĕn), meaning Oriental or Eastern, the name first applied by Pliny to the Bedouin Arabs who inhabited Mesopotamia. Later it became gradually extended in meaning to include the inhabitants of the Syro-Arabian desert, who harassed the frontiers of the Roman Empire, and still later it was given to any Mohammedan enemy of the Christians. In the latter sense it was applied to those who embraced the doctrine of Mohammedan and held it to be their duty to spread the Moslem faith everywhere, which in fact meant to conquer the whole world. To accomplish this purpose they resisted the Crusades and made many invasions of Europe, giving men a threefold choice,-the Koran, tribute, or the sword.

The Saracens originated a style of architecture peculiar to themselves, of which representative specimens are still abundant in Southern Europe. It is spoken of generally as Arabian architecture in Asia and Egypt, and as Moorish in Spain. The finest specimens of Saracenic architecture in Asia are found in the public buildings erected in Persia by Shah Abbas, in the early part of the 17th century. These include the magnificent mosque known as Mesjid Shah, a structure 223 feet long and 130 feet wide. It is crowned by a double dome 165 feet high. The most noted specimen in Africa is the beautiful mosque built by Ibn Tooloon in 876 A.D., at Cairo, Egypt. Another fine specimen near Cairo is the mosque and tomb of Kaid Bey, completed in 1463. See Moors.

SARAGOSSA (sär-à-gŏs'sà), a city of Spain, capital of the province of Saragossa, on the Ebro River, 175 miles northeast of Madrid. It has ample railroad facilities and is important as a trade and manufacturing center. The city is divided into two parts by the river, which is crossed by a stone bridge which dates from 1437. Most of the streets are narrow and tortuous and many of the buildings are low, but it has a number of structures of historic interest. Among them are two cathedrals, known as El Pilar and La Seo, the former dating from 1677 and the latter, a Gothic structure, was completed in the 13th century. The university was founded in 1474 and was once an institution of wide fame. At present it has 800 students and a library of 20,000 volumes. Other noted institutions include several hospitals, a museum, a townhouse, and an exchange. The Moorish citadel, called the Aljaferia, formerly served as a palace for the kings of Aragon, but later became connected with the Inquisition. Among the manufactures are leather, silk and cotton textiles, utensils, vehicles, cigars, and clothing.

Saragossa is an attraction for pilgrims from many parts of the Spanish world, who come here to witness the image of the Virgin, a fine figure in one of the cathedrals. The place is an ancient city, dating from a remote period. Its present name was applied in honor of Caesar Augustus in 25 B. C. The Romans made it an important trade center, but it was captured by the Moors in the 8th century. Alfonso of Aragon captured it in 1118, after which it remained the capital of the kingdom of Aragon for some time. The French besieged it in 1808 and 1809, during which time many perished. It was then that a woman named Augustina snatched the match from the hands of a dying cannoneer and fired his cannon at the enemy. She is known as the Maid of Saragossa and her fame has been extended by the writings of Southey and Byron. Population, 1910, 105,788.

SARATOGA (săr-à-tō'gà), Battle of, an important engagement of the American Revolution. It occurred near Saratoga Springs, N. Y., on Oct. 7, 1777, and is classed by Creasy as one of the "Fifteen Decisive Battles of the World." The Continental army had been victorious at Bennington and was daily increasing its strength, while the British under Burgovne were awaiting help from General Howe. General Gates held a strong position at Bemis Heights, which Burgoyne decided to storm, but in this he was: thwarted by the prompt and vigorous action of Benedict Arnold, who led a furious opposition with 3,000 men. The battle ended at dark without decisive results, and on the 9th Burgoyne fell back to Saratoga, where his supplies were cut off and he was besieged by the Continentals: under General Gates. After several light skirmishes, Burgoyne decided to surrender, which he did on the 17th, with the understanding that he and his men were not to serve against the

Americans again. The Continentals secured 5.804 prisoners, 4,650 muskets, and 42 guns. A beautiful obelisk 155 feet high is located 12 miles east of Saratoga Springs, on a bluff near the Hudson, which was the scene of the principal

engagement.

SARATOGA SPRINGS, a village of New York, in Saratoga County, 38 miles north of Albany, on the Boston and Maine and the Delaware and Hudson railroads. It is one of the most noted watering places of the United States. In its vicinity are many mineral springs. Fashionable and convenient cottages and hotels are abundant. The prevailing character of the water is cathartic and it is bottled and shipped in large quantities. About five miles from the city is Saratoga Lake, to which an electric railroad extends. Among the noteworthy buildings are the public library, the State armory, the Convention Hall, the Athenaeum, the Saint Faith School, and the Saint Christina Home for Orphans. Large quantities of mineral waters are bottled and shipped. The manufactures include clothing, machinery, cigars, and earthenware. It has a growing trade in fruits and merchandise. The place was settled in 1773 and General Schuyler erected a fort here in 1777, but the village was not chartered until 1834. Population, 1910, 12,693.

SARATOV (så-rä'tôf), or Saratoff, a city of Russia, capital of the government of Saratov, on the Volga River, 460 miles southeast of Moscow. It is a commercial and manufacturing center, has steamboat and railroad facilities, and is surrounded by a fertile farming and fruit-grow-The site of the city is on the east ing country. side of the Volga, where it stretches over a rolling tract of land. Many of the streets are improved by pavements, gas and electric lighting, rapid transit, waterworks, and beautiful gardens and parks. Among the principal buildings are two cathedrals, a museum, the government buildings, and several excellent high schools, colleges, and hospitals. The manufactures include woolen textiles, cotton and silk goods, cordage, pottery, tobacco products, furniture, chemicals, leather, clothing, and machinery. The exports consist principally of corn, tobacco, hemp, flax, and live stock. Population, 1911, 198,508.

SARCOPHAGUS (sär-kŏf'à-gus), a stone coffin or tomb, employed to inclose a dead body. The wealthy classes of Egypt were the first to . use sarcophagi, but later the practice extended to the inhabitants of the region of Asia bordering on the Mediterranean Sea, particularly to the Phoenicians, Carthaginians, Persians, Grecians, and Romans. Many of these structures were decorated and ornamented with elaborate carvings and inscriptions. The most beautiful specimens were found in the Egyptian pyramids. Coffins of stone have been used to some extent for royal or distinguished persons even in modern times.

SARD, a reddish-brown species of chalcedony, distinguished from carnelian by the deepness of its color. When held between the eye and the light, it has a flesh-red color. The ancients prized it highly as a gem, and early writers credit it with having virtue in cheering the heart and encouraging the intellect. See Chalcedony.

SARDANAPALUS (sär-dà-nà-pā'lus), the Greek name of a number of kings of Assyria, one of whom was the last king of the Assyrian empire of Nineveh. The Greek writer Ctesias described him in terms that have made his name proverbial as the type of luxury. His oppression caused a Median satrap named Arbaces to join a native revolution against him in 785 B. c. This resulted in his army being defeated and withdrawn into Nineveh, where he was besieged for two years. When it became apparent that resistance was in vain, he gathered his vast treasures in his palace and set them on fire, both he and his numerous wives perishing in the flames. It is thought by some writers that the account given by Ctesias is not historical, and that the name is a corruption of Assurbanipal.

SARDINE (sär'den), a class of small fishes, belonging to the same genus as the herring and the pilchard, much valued as food. They are mostly canned in oil. This is done after salting and partly drying by pouring hot olive oil, or oil and butter, over them and sealing in a tin can. The young of the herring and menhaden are preserved in the same way in Canada and the United States. Sardines are abundant in the Mediterranean and off the western coast of Europe, where they are caught and canned in large quantities. Anchovied sardines are those

preserved in red wine.

SARDINIA (sär-dĭn'ĭ-à), an island in the Mediterranean, lying south of Corsica. Next to Sicily it is the largest of the Mediterranean islands. It is separated from Corsica by the Strait of Bonifacio, a channel about seven miles wide, and its shores are indented by numerous gulfs, including the gulfs of Asinara, Oristano, Palmas, Cagliari, and Orosei. The length from north to south is 155 miles; the width, 70 miles;

and the area, 9,294 square miles.

DESCRIPTION. Several mountain groups characterize different parts of the island. The most elevated peaks are in the eastern part. Many of them are chiefly of granite formations. Mount Gennargentu, height 6,225 feet, is one of the highest peaks. The coasts are generally steep and rugged and near the shore are a number of small islands, but they are mostly off the northern and western coasts. Sardinia has an abundance of drainage, the most important rivers including the Coghinas, flowing into the Gulf of Asinara in the north; the Tirso, flowing into the Gulf of Oristano in the west; and the Flumer dosa, flowing into the Mediterranean on the east The climate is mild, with a temperature ranging from 30° to 90°, and it has an amplitude of rainfall. Both the climate and rainfall vary somewhat on account of elevation, but it may be said

that the most pleasant weather is experienced in autumn.

INDUSTRIES. The soil is generally fertile, especially in the valleys and coast regions, and there are an abundance of timber, fine fisheries, and valuable deposits of minerals. Among the mineral productions are sulphates of iron and copper, arsenic, nickel, cobalt, silver, zinc, antimony, lead, quicksilver, granite, and limestone. Agriculture is the principal occupation, though mining, manufacturing, and fishing have been developed considerably. The principal soil products include maize, wheat, beans, barley, tobacco, hemp, vegetables, flax, oranges, lemons, and many other fruits. The fisheries yield sardines, tunny, anchovies, and coral. Cattle, horses, sheep, goats, and swine are reared profitably. Among the manufactures are cotton textiles, silk and woolen fabrics, clothing, hardware, machinery, furniture, and cured fish. Several railroad lines penetrate different parts of the island, the most important being the line built from the Gulf of Asinara to the Gulf of Cagliari, which touches the coast of the Gulf of Oristano.

GOVERNMENT AND INHABITANTS. Sardinia is now divided into the provinces of Sassari and Cagliari. The local government is the same as that of Italy, to which country it belongs. The people are a mixture of Italian and Spanish stock and somewhat resemble the Greeks. They are in a very backward state educationally. Fully 80 per cent, are unable to read or write. Public education may be said to be in a primitive condition, the schools being dominated largely by the clergy. The family feud, or vendetta, is still practiced, but to a more limited extent than in Corsica. Universities are located in Cagliari and Sassari and elementary schools and convents in the smaller towns. The religion is almost exclusively Roman Catholic. Cagliari, on the Gulf of Cagliari, is the capital and principal sea-Other cities include Sassari, Tempio, Alghero, and Oristano. Population, 1917, 841,417.

HISTORY. The early history of Sardinia is wrapped in tradition, but it is reasonably certain that a high state of civilization was developed at the time of the greatest prosperity of Greece. It was known to the Greeks as Ichnusa. The Carthaginians conquered it about 480 B. C., and during their occupancy it became noted for its production of corn and fruits. It was made a Roman possession in 238 B. c. and was long noted as the granary of Rome. The Vandals, Goths, and Saracens successively conquered it after the fall of the Roman Empire, but the Eastern Empire recovered it in 534 A. D. Saracen invaders obtained a foothold a second time, but they were driven out by an allied army from Genoa and Pisa in 1299. The conquerors divided the island as two separate possessions. Shortly after it became a territory of the kings of Aragon and remained tributary to Spain until it was annexed by the British, in 1708. The Treaty of Utrecht, in 1713, transferred it to Austria, and in 1720 it became a part of the kingdom of Sardinia under the house of Savoy. The history is merged into that of Italy from the ascension of Victor Emmanuel II. to the throne of United Italy.

SARDINIA, Kingdom of, formerly a kingdom of Europe, situated in the southern part of the continent. It was formed principally of the duchies of Savoy and Genoa, parts of Milan and Montferrat, the county of Nice, the principality of Piedmont, and the islands of Caprera and Sardinia. It had an area of 28,769 square miles and a population of 5,167,542. Victor Amadeus II., Duke of Savoy, in 1720 assumed the title of King of Sardinia. This he did in accordance with a treaty with Austria, which provided that he was to surrender Sicily and receive in exchange the island of Sardinia. The history of the kingdom is largely wrapped in the fortunes of war with Austria and other countries, and is important as bearing upon and forming the nucleus of the present kingdom of Italy. The last war of the kingdom was under Victor Emmanuel II., who formed an alliance with France against Austria in 1859. In 1861 he came into possession of all of Italy, except Rome and Venetia, and assumed the title of King of Italy instead of King of Sardinia. He added Venetia to the kingdom in 1866 and completed the union of Italy by annexing the papal states in 1870.

SARDIS (sar'dis), or Sardes, the name of an ancient city in Asia Minor, capital of Lydia, on the Pactolus River, about 45 miles east of Smyrna. The Greek writer Aeschylus made the first mention of the city. It was captured by the Cimmerians about 650 B. c. The greatest prosperity was reached in the reign of Croesus, who became its king about 568 B. C., when it was in possession of fabulous wealth and power. The importance of Sardis was due to its military strength, the fertility of the surrounding country, and its location on the highway leading from the interior of Asia to the Aegean coast. The Athenians burned it in 503 B. C., and after the Roman conquest it was made a provincial government. Sardis is mentioned in the book of Revelation (Rev. iii., 1-5). In profane history it is spoken of as the residence of both Xerxes and Cyrus the Great. Timour conquered it in 1402, when much of it was destroyed. The site is at present occupied by a dilapidated village called Sart.

SARDONYX (sär'dð-nīks), a mineral of the quartz variety, so named because it contains layers of sard and white chalcedony. It is a kind of onyx and is used quite extensively in making brooches and other forms of jewelry. In some specimens the color is orange or reddish yellow, while in others it is red with white markings.

SARDOU (sär-doo'), Victorien, dramatist, born at Paris, France, Sept. 7, 1831; died Nov. 8, 1908. He descended from a family in humble circumstances and, after studying medicine for some time, engaged in literary work, producing his first comedy in 1854. This proved a failure, but he continued industriously at work and finally attained recognition by producing several dramatic compositions. His plays at-



VICTORIEN SARDOU.

tracted the favorable notice of Sarah Bernhardt, who made them popular at several leading theaters, both in France and the United States, He was decorated with the Legion of Honor in 1863, and became a member of the French Academy in 1877. His comedies are

emotional and for the most part improbable, but they are full of witty dialogue and are calculated for rapid action. Among his most noted productions are "Uncle Sam," a satire on American society, "Daniel Rochat," "Scrap of Paper," "Women of Silence," "Dora," and "Diplomacy." He wrote three plays for Sarah Bernhardt, entitled "Theodora," "Fedora," and "La Tosca."

SARGENT (sär'jent), Epes, journalist and poet, born in Gloucester, Mass., Sept. 27, 1813; died Dec. 31, 1880. He studied in the schools of Boston and at Harvard University and subsequently engaged as editor and publisher of the Boston Daily Advertiser. In 1839 he took an editorial position with the New York Mirror, and afterward served in a similar position on the Boston Evening Transcript. Later he retired from newspaper work to engage as editor of a series of school books and wrote a number of biographies, poems, and dramas. His best biography is "Life of Henry Clay," his best known song, "Life on the Ocean Wave," and his most popular drama, "The Bird of Genoa." "Song of the Sea" is a favorite poetic production.

SARGENT, John Singer, painter, born in Florence, Italy, Jan. 12, 1856. He studied classics and painting at Florence, and in 1874 went to Paris as a pupil of Carolus Duran. In 1879 he exhibited "Neapolitan Children Bathing," which attracted much attention on account of its trueness to nature. He removed to London in 1884 and visited the United States in 1887 and several times afterward, residing while in America chiefly in Boston and New York. The highest medals and honors were awarded him at the Paris expositions of 1889 and 1900. He was a member of many noted associations and became an officer of the Legion of Honor in 1895. Among the best known of his paintings are "Hall of the Four Children," "Pageant of Religion," "Prophets," "Smoke of Ambergris," and "La Carmencita." He painted many portraits. including

those of Joseph Jefferson, Edwin Booth, President Roosevelt, Carolus Duran, and Henry Marquand.

SARGON (sär'gon), the name of several kings of Babylonian descent who reigned over Assyria. Sargon I. is assigned by most scholars to about 2800 B.C., who extended the dominion of his people far beyond the valley of the Euphrates. Sargon II. succeeded Shalmaneser IV. as King of Assyria in 722 B.C. He captured Samaria after a siege of three years and soon after subdued a revolt of the Medians and the Syrians. In 709 he subdued Babylon. At that time the Assyrian Empire extended to Cyprus and into Cilicia. In the meantime he devoted much energy to the construction of buildings and highways. He died in 705 B.C. and was succeeded by his son, Sennacherib.

SARMATIANS (sär-mā'shanz), a powerful race of nomadic people of Europe and Asia, who occupied the vast region lying in the vicinity of the Caspian, Black, and Baltic seas in the time of the Romans. It is thought that they were of Asiatic origin. Tradition makes them the descendants of the Amazons by fathers of Scythian birth. Their women became famous as warriors, and as such entered the campaign on horseback with lance and spear. At first composed of various tribes, they became amalgamated into a powerful nation, and in the 4th century B. C. made the Scythians tributary. No barbarian peoples were more formidable in harassing the Roman frontiers than they. It is probable that they were conquered by the Goths in the 4th century A. D. Much of the history of Sarmatia was recorded by Ptolemy, but the manner in which he speaks of the Slavs, Finns, Goths, and other peoples of a barbarian nature makes it certain that he applied the term quite loosely.

SARNIA (sär'nĭ-á), a port city of Ontario, capital of Lambton County, opposite Port Huron, Mich., on the Saint Clair River and on the Grand Trunk and the Père Marquette railways. It has connection with Port Huron by a steam ferry and a railway tunnel under the river. The manufactures include malt liquors, woolen goods, machinery, leather, and agricultural implements. It is a port of entry and has a large lake trade. The chief buildings include the county courthouse, the high school, the public library, several banks and hotels, and a number of churches. Electric lighting and waterworks are among the municipal improvements. Population, 1911, 9,947.

SARPEDON (sär-pē'dun), in classical mythology, the son of Zeus and Europa. He fought with the Trojans at Troy, where he was distinguished for his courage against the Greeks, but was slain by Patroclus. His brothers, Sleep and Death, carried his body back to Lycia, where his kinsmen gave him honorable burial.

SARSAPARILLA (sär-så-på-rĭl'là), the dried root or rootstalk of the smilax, a genus of shrubby climbing plants native to tropical America. The plants grow only in the presence

of an abundance of moisture, developing roots many feet long but remarkably slender. They are sold in the market as drugs, being used in the preparation of medicine. The drug is sold



SARSAPARILLA.

largely as a purifier of the blood, but its value for that purpose is overestimated.

SARTO (sar'tô), Andrea del, eminent Florentine painter, born in Florence, Italy, in 1487; died there, Jan. 22, 1531. He was the son of a tailor named Angelo Vannucci, but was named Del Sarto, meaning the tailor's son. After studying as a pupil of Pietro

di Cosimo, he became inspired with a love for fresco painting, which line includes his greatest achievements. Francis I. invited him to Paris in 1518, where he painted many excellent works, among them "Charity," now in the Louvre. After returning to Florence, he devoted himself to sacred subjects. The most noted of his works are "The Sacrifice of Abram," now in Dresden; "Madonna with Saints," in the Berlin Museum; "Last Supper;" "Contending Theologians;" and a series of frescoes from the life of John the Baptist.

SASKATCHEWAN (săs-kăch'e-wŏn), a river of Canada, which rises in the Rocky Mountains by two sources called the North and the South Saskatchewan. The two branches unite some distance below Prince Albert, in Saskatchewan, and flow east into Lake Winnipeg. The north branch is 815 miles long and the south branch, 775 miles. From their confluence to Lake Winnipeg the distance is 280 miles. In its course the Saskatchewan passes through Cedar Lake. The valley is a fertile region and contains extensive and valuable forests and vast deposits of salt, iron, coal, and other minerals. About 1,000 miles of navigable waterway are afforded and in the upper course are ample opportunities for utilizing water power. The river is frozen from the middle of November to the middle of April.

SASKATCHEWAN, a Province of the Dominion of Canada, located in the west central part. It is bounded on the north by Mackenzie, east by Keewatin and Manitoba, south by North Dakota and Montana, and west by Alberta. The northern boundary is 265 miles and the southern is 375 miles long. It has a length from north to south of 720 miles. In form it resembles an upright oblong, whose base rests upon the boundary line of the United States in latitude 49°, while its upper border lies in latitude 60°. The

area is 251,887 square miles, of which 27,112 square miles are water surface.

DESCRIPTION. The surface is diversified, but may be said to be generally of an undulating character, and includes the principal part of the great valley of the Saskatchewan River. belts of prairie steppes lie parallel to the Rocky Mountains, but are not very distinctly marked. The first of these crosses Manitoba and enters Saskatchewan, being a broken escarpment about 500 feet high, and in the west central part of the Province gives way to the forest belt of the north. It is pierced by the valley of the Red Deer River and extends toward the northwest as the Porcupine Mountains and Pasquia Hills. The second steppe, known in the United States as the Coteau du Missouri, extends in a northwesterly direction across the Province and into Alberta. It is about 200 miles wide, has an altitude of 1,600 feet above sea level, and is more or less broken into spurs and hills. Various names are applied in different parts, including Bear Hills, Eagle Hills, and Vermilion Hills. Moose Hills and Touchwood Hills, which belong to this escarpment, rise from 250 to 300 feet above the surrounding plains. In the southwestern part is the third steppe, which consists in part of a plain and in part of small plateaus. The general altitude ranges from 2,000 to 3,000 feet above the sea, being highest on the border of Alberta. All of the southern part of the Province may be described as a prairie country, which merges into a region broken by wooded areas in the central part, while the northern section is densely wooded with a valuable growth of timber.

The drainage belongs to four great basins, separated by low swells of ground. These basins include those of Lake Winnipeg and the Missouri, Churchill, and Mackenzie rivers. southwestern part lies in the basin of the Missouri and is drained by French Creek and Wood River, both of which cross the southern border and enter the Missouri in Montana. Through the south central part flows the Saskatchewan, which rises in Alberta and flows entirely through the Province into Keewatin, where it discharges into Lake Winnipeg. The southeastern part is drained by the Souris or Mouse River, which makes a bold curve through North Dakota, thence enters Manitoba and joins the Assiniboine, which has its source in Saskatchewan. The Churchill drains a large section in the north central, flowing eastward through Keewatin into Hudson Bay. The northwestern part is drained through Lake Athabasca, on the border of Alberta, toward the northwest, hence the overflow reaches the Arctic Ocean through the Mackenzie River. Many lakes characterize the central and northern parts, all of which are rich in fish and surrounded by fine forests. Lake Athabasca, partly in Saskatchewan and partly in Alberta, is the largest sheet of water. Next in size is Wollaston Lake, in the northeastern part, and it is drained in two directions, one outlet leading

southward through Reindeer Lake and the Churchill and the other toward Lake Athabasca and the Mackenzie.

The climate is continental, being cold in winter and warm in summer. Rainfall is scant in the southern part, where it ranges from twelve to twenty inches, while the central and northern portions have an abundance of precipitation. However, the summers are favorable to the cultivation of crops in the southern part, where irrigation is employed to some extent, but the northern section is not adapted to general farming. Snow falls to a depth of one or two feet and the winters are long and cold, but quite clear. At Regina, in the south central part, the extremes range from 40° below zero to 90° above. Blizzards occur in the southern part during the winter, where the wind has a clear sweep across the prairies, but they are rare in the northern section.

AGRICULTURE. A large majority of the inhabitants are engaged in agricultural enterprises. It is estimated that 32,000 square miles are suitable for farming by irrigation, 86,500 square miles produce grain without artificial watering. and 106,000 square miles are adapted to ranch-

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TOO MILES SASKATCHEWAN.

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at present. Farming is carried on most extensively on the fertile plains of the southern part, where large quantities of small grain are grown. Hard spring wheat is the principal crop and the yearly production ranges from 35,500,000 bushels to 55,-

rainfall and

other essentials of the growing season. Settlements have been extending with remarkable rapidity, hence the cultivated area is becoming greatly enlarged. Potatoes of a fine grade are grown with profit. Oats and barley produce abundantly and hay yields good returns. Small fruit, such as grapes, currants, plums, and strawberries, are cultivated extensively and a northern variety of apples is grown with good results. Ranching is carried on most extensively in the south and southwest, where cattle sustain themselves almost the entire year on the open plains. Sheep and horses are grown in large numbers. Other products include flax, sugar beets, rye, and vegetables.

OTHER INDUSTRIES. Lumbering is an important enterprise in the northern part, where the forest wealth is enormous. Many species of the hardy northern woods abound, but pine and spruce predominate. These forests yield large returns for fuel and building purposes. Coal deposits, both bituminous and lignite, are widely distributed, but the latter is most abundant, being mined extensively for local purposes in many parts of the Missouri drainage basin. Iron deposits exist north of Lake Athabasca, but these are not worked at present. Limestone, granite, and clays are widely distributed.

Manufacturing is confined chiefly to products consumed locally and to the railway repair shops. However, there is a considerable output of lumber and lumber products for export. Dairying is receiving considerable attention and the butter and cheese produced are of a fine quality. Many flouring mills are operated and sugar is manufactured from sugar beets. Other manufactures include pottery, brick, furniture, and clothing. Large quantities of whitefish, pickerel, sturgeon, and other species of fish are found in the lakes, but the catches are used chiefly for local consumption.

COMMERCE AND TRANSPORTATION. Saskatchewan exports large quantities of barley, oats, flax, and cattle. Within recent years it has materially extended its exportation of flour and lumber. The imports consist principally of manufactured materials, such as clothing, foodstuffs, and farming machinery. Communication by the waterways extends a distance of 1,500 miles, being chiefly from Lake Winnipeg to the interior by the Saskatchewan and its tributaries. Additional transportation facilities are afforded by numerous lakes, many of which will ultimately be connected by a network of canals. The railway lines have a total of 6,125 miles. They include principally the Canadian Pacific, the Grand Trunk, both of which cross the Province from east to west, and the Canadian Northern Railway. These lines and others have branches to many interior points.

GOVERNMENT. The Lieutenant Governor is appointed by the Governor General of Canada and is assisted by an executive council, or responsible ministry, of four members, consisting of the premier, attorney general, commissioner of education and commissioner of agriculture. Legislative authority is vested in the assembly of one department, known as the Legislative Assembly, which is composed of 41 members

elected by the people. All native born and naturalized citizens may vote at the elections. The Lieutenant Governor receives a salary of \$9,000; the members of the executive council. \$5,000: and the members of the Legislative Assembly, \$1,000. Local government is administered by the officers of the counties, municipalities, and town-

EDUCATION. A system of public schools is maintained for the free attendance of all persons who are of school age. The schools are supported partly through the sale of public lands and partly by local taxation. New schools may be organized by the settlers, but each school district, when so organized, must have not fewer than ten pupils. High schools and institutions of industry and higher learning are maintained in the cities. A commissioner of education has general charge of public education, but additional supervision is provided in the cities and counties. All the larger towns have inspectors of schools. The provincial university, established by the Legislative Assembly in 1908, is at the head of the educational system. A number of parochial and private denominational institutions are in a flourishing condition.

INHABITANTS. The southern part contains the larger number of inhabitants, while the northern section is at present almost entirely unoccupied, except by government officials and hunters. The greater number of people are of Canadian descent, but a large portion is made up of immigrants from the United States. Regina, in the southern part, is the capital. Moose Jaw, in the southwest, is an important distributing point. Prince Albert, on the Saskatchewan, is noted as a railway and commercial center. Other towns include Saskatoon, Indian Head, Moosomin, and Yorkton. In 1901 the Province had a population of 91,460. The rapid growth and development are evident by the fact that the population in 1911 was 492,432.

HISTORY. Saskatchewan was first explored by French fur traders and they were succeeded by the employees of the Northwest Company, whose headquarters were at Montreal. The Hudson Bav Company took control of the region in 1821 and held it until 1869. Settlements began to be made by that time, but the early development was slow, owing to a lack of transportation facilities. Regina was made the seat of civil government in 1882. Louis Riel became the head of a rebellion in 1885, when about 35,000 Black Feet, Crees, and Ojibwas became dissatisfied through the destruction of the buffalo and other wild animals utilized for food. A number of these Indians and many half-breeds constituted a formidable force, which was met in a final battle by Canadian troops under General Middleton at Batoche on May 9th, where the rebels were defeated after an engagement lasting four days. Riel was captured, was tried for treason, and after due conviction was hanged. The government was that of a Territory until

1905, when it was admitted as a Province of the Dominion. It contains the larger part of the former districts of Assiniboia, Athabasca, and Saskatchewan.

SASKATOON, a city of Saskatchewan, on the Saskatchewan River and on the Canadian Northern, the Canadian Pacific, and the Grand Trunk Pacific railroads. It has manufactures of brick, mattresses, flour, and machinery. The retail and wholesale trade is very extensive. Among the features are the courthouse, high school, Carnegie library, and University of Saskatchewan. Population, 1911, 12,004.



SASSAFRAS.

SASSAFRAS (săs'sà-frăs), an extensive genus of plants, several species of which are noted for the medicinal virtues of their roots. They are widely distributed from Canada to the Gulf, ranging in size from a large tree fifty feet in height to a small bush in the cold regions. The sassafras-nut tree of Brazil, the plumenutmeg tree of Australia, and the sassafras laurel of California are allied species.

SATAN. See Devil.

SATELLITE (săt'ěl-līt), a celestial body attending upon and revolving around some planet. It is often spoken of as a secondary planet, while the body around which it revolves is called a primary planet. The earth's satellite is called the moon. It has been ascertained that the eclipses, inclinations, inequalities, and reciprocal attractions of the satellites of all the planets more or less distinctly correspond with that of the moon. While the earth has but one satellite, other planets have a larger number, but some of the planets are not attended by any. Neptune is accompanied by one; Mars, by two; Uranus, by six; Jupiter, by seven; and Saturn, by nine. It is supposed that Saturn's rings are composed of a multitude of satellites. The following table gives the more interesting facts in relation to the different satellites, but several of those referred to, as the unnamed satellite of Jupiter, were not generally admitted until recently:

NAME OF SATELLITE.	PLANET.	YEAR DIS- COVERED.	DIAMETER IN MILES.	DISTANCE FROM PLANET.
Moon	Earth Mars Mars	1877 1877	2,160	238,818 5,900
Deimos	Jupiter	1610	2,352	14,600 261,000
Zuropa	Jupiter	1610	2,099	415,000
Ganymede	Jupiter	1610	3,436	664,000
Callisto	Jupiter	1610	2,929	1,167,000
Unnamed	Jupiter	1892	100	
Mimas	Saturn	1789	600	117,000
Encheladus	Saturn	1789	800	157,000
Tethys	Saturn	1684	1,100	186,000
Dione	Saturn	1684	1,200	238,000
Rhea	Saturn	1672	1,500	332,000
Titan	Saturn	1655	3,500	771,000
Hyperion	Saturn	1848	500	934,000
Ipatus	Saturn	1674	2,000	2,225,000
Phoeba	Saturn	1898		
Ariel	Uranus	1854	500	120,000
Umbriel	Uranus	1851	400	167,000
Titania	Uranus	1787	1,000	273,000
Oberon	Uranus	1787	800	365,000
Unnamed	Neptune	1846	2,000	225,000

SATIN (săț'în), a silk fabric of a close texture, made with an overshot woof and a glossy surface. The warp forms have a close and smooth surface, and, to obtain its luster, it is passed between heated cylinders. An interval of fifteen threads occurs in a full satin twill.

SATINWOOD, an ornamental wood obtained in the West and East Indies. It is one of the most highly prized light woods for cabinetwork. The best grades that come from the West Indies are lighter in color than those produced in the Asiatic islands, and are considered the most valuable. Several species of trees yield satinwood. The finest products secured in the West Indies are from the prickly ash, called Bahama satinwood. Satinwood has a close grain and is hard and durable. It is capable of taking a fine polish and is exported largely for furniture. In India it is used for building purposes, especially for floors in dwellings.

SATIRE (săt'īr), the employment of sarcasm, irony, or keen wit in attacking individuals, manners, or social or political movements. The Romans were the first to employ satire in holding wickedness and folly up to public ridicule and censure. Lucilius and Horace are generally regarded as the originators of satire, and toward the end of the republic it was used both in prose and verse. Lowell is the great master of satire in America. The leading English satirists are Byron, Pope, and Dryden, and the leading Germans, Goethe and Wieland. The sting of satirical writings lies in the discovery between the man spoken of as he appears to himself and the man as he appears to others.

SATOLLI (så-tôl'lè), Francesco, prelate and diplomat of the Pope of Rome, born in Perugia, Italy, in 1841. After studying in the seminary of his native city under Joachim Pecci and Pope Leo XIII., he became chief assistant of that pontiff in promoting theological studies. Later he was made professor in the Roman

Seminary, but soon became Archbishop of Lepanto. In 1889 he was sent as a representative of the Pope to Baltimore, Md., where the centenary of the Roman Catholic hierarchy was celebrated, and he likewise represented the Holy See at the inauguration of the Catholic University in Washington, D. C. In 1893 he became apostolic delegate to the Roman Catholic Church in the United States. This appointment gave the church in America a form of autonomy, his power including the exercise of pontifical jurisdiction, limited only by appeal to the Pope. In 1896 he was made cardinal, being succeeded in the same year in the office of delegate by Sebastian Martinelli. He is the author of several works on theology and philosophy, including "A Course in Philosophy." He died Jan. 8, 1910. SATURDAY (săt'ŭr-dā), the seventh and

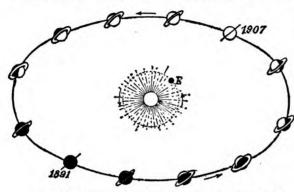
SATURDAY (săt'ŭr-dā), the seventh and last day of the week, so named from Saturn. It is the Sabbath of the Jews and several Christian denominations, including the Seventh Day Adventists and the Seventh Day Baptists.

SATURN (săt'ŭrn), a deity of ancient Italy. He is generally regarded by the Romans and modern writers as identical with Cronus, the god of time, in its sense of eternal duration, and of agriculture. He is represented as having married Rhea, daughter of Uranus and Gaea. His uneasy conscience made him fear that his children might some day rise up against his authority, as he himself had done in the case of his father, and, in order to render the prophecy impossible of fulfillment, he swallowed each child as it was born, greatly to the sorrow and indignation of his wife, Rhea. She resolved to save the sixth and last child, who was none other than Zeus, and did so by placing a stone in baby clothes, which Saturn swallowed in his eager haste without noticing the deception. The child was nourished, protected, and educated in Crete, and the stone which had counterfeited him was placed at Delphi, where it was long exhibited as a sacred relic.

When Zeus reached manhood he made war against Saturn and the Titans, and at length deprived his father of supreme power. The career of Saturn as a ruling Greek divinity ceases with his defeat, but like other gods he was supposed to be still in existence, and is by some writers connected with the government of Italy in the time of Janus, sharing sovereignty with the latter. The myth of Saturn swallowing his children is evidently intended by the poets to express the melancholy truth that time destroys all things. The reign of Janus and Saturn was so thoroughly peaceful and happy that it became known as the Golden Age. He was represented bearing a sickle in one hand and a wheat sheaf in the other. A temple was erected to him at the foot of the Capitoline Hill, in which were deposited the public treasuries and laws of the state.

SATURN, one of the major planets, which is sixth in distance from the sun. It is the second

planet in size, being exceeded only by Jupiter, and has a mean diameter of 71,000 miles. It occupies the most remote position known to the ancients, shines with a feeble but steady pale-yellow light, and to the eye appears as large as a fixed star of the first magnitude. The polar diameter is about 68,000 miles and the equatorial, about 74,000. The movement upon its axis is with remarkable rapidity, making a complete revolution in 10 hrs. 4 min. 23.8 sec., thus having a day less than one-half as long as ours. However, its year is much longer, the time of a complete revolution around the sun being twenty-nine and a half earthly years. Its movement can



SATURN'S REVOLUTION AROUND THE SUN, SHOWING THE RINGS AS SEEN FROM THE EARTH AT DIFFERENT TIMES.

be noted by any careful observer, since it passes through about 12° of the sky in a year. The weight is estimated at about eighty times that of the earth, but its density is only one-eighth of the earth, being about equal to that of pine wood.

Saturn revolves about the sun at a mean distance of 886,000,000 miles, but as the earth and Saturn occupy different portions of their orbits, the distance between them at different times may vary 200,000,000 miles. Astronomers generally agree in stating that nine satellites attend Saturn, though some writers think even more, and it is surrounded by a system of rings. Some of the rings shine with a golden light and others are transparent. It is thought that the rings are composed of an immense multitude of small satellities, and that many of them resemble the meteors surrounding the sun. The nine satellites are named Tethys, Enceladus, Mimas, Dione, Rhea, Titan, Hyperion, Ipatus, and Phoeba.

SATURNALIA (sắt-ur-nā'lī-à), a national festival of the Romans in honor of Saturn, celebrated after the gathering of the harvest, usually from Dec. 17 to 23. It was a time of universal cessation from labor, rejoicing, and merrymaking. No business was transacted, the courts were closed, friends sent presents to each other, and school children were given a holiday. Rome was flocked with crowds of people from the sur-

rounding country. All classes partook of the general exultation, giving themselves over to enjoyment, practical jokes, and general rejoicing. Social distinctions were for a time suspended, or even reversed. The Romans entered so heartily into the spirit of this festival that masters waited upon their slaves, the latter being dressed on these occasions in the garments of their superiors. The modern carnival now celebrated in Italy is a survival of the ancient Saturnalia.

SATYRS (sā'tērz), in Greek legends, a race of woodland sprites, who personified the free life of the forest. They were generally repre-

sented as half human and half animal, the upper part being that of a human being and the lower that of an animal. Their appearance was both grotesque and repulsive, but their life was one of pleasure and self-indulgence, mostly given to the chase and wild music. At intervals they partook of wine and indulged in restful slumber. Both mortals and the gentle woodland nymphs dreaded them, mostly because of their reckless sports. were represented in the train of Dionysius and were inseparably connected with his worship. Greek poets delighted to praise the innocent frolics of the little saturs, and sculptors represented the older forms as nearly approaching human beings, but placed horns upon their heads and gave them the feet and legs of a goat. The Satyr of Praxiteles at Athens is a famous

specimen of Greek sculpture. Pliny used the word to indicate a kind of ape.

SAUERKRAUT (sour'krout), an article of food prepared from cabbage. The cabbage is gathered when the heart is firm, cut into shreds, and packed with salt in a cask or barrel, where it is allowed to ferment under pressure. The addition of caraway seeds, juniper berries, and other condiments improves the taste. Sauerkraut was first made in Germany, but is now produced and sold in the markets of all countries of Europe and America having a temperate climate.

SAUL, the son of Kish, noted as the first King of Israel. His father was a wealthy chief of the tribe of Benjamin, and he was selected for the office by Samuel in response to the request of the Israelites for a king. Saul was a man of large stature and impervious character, and by his courage and military capacity soon won successes over the Philistines, Moabites, Ammonites, Edomites, and Amalekites. Later he became cruel in war and developed a most pronounced jealousy of his son-in-law, David, who was his attendant and the chief of his escort. Samuel was compelled to retire from his court and secretly anointed David as king, but did not cease to mourn for the monarch. Saul was defeated in a battle with the Philistines on Mount Gilboa and killed himself by falling upon

a sword. His reign extended from 1095 to 1056 B. C. He was succeeded by David.

SAUGUS (sa'gus), a town of Massachusetts, in Essex County, eight miles north of Boston. It is on the Saugus River and the Boston and Maine Railroad, and is the residence of many Boston business men. The chief buildings include the townhall, the high school, several churches, and a library of 8,500 volumes. Woolen goods, brick, boots and shoes, spices, and machinery are among the manufactures. The place was incorporated in 1815. Population, 1905, 6,253; in 1910, 8,047.

SAULT SAINTE MARIE (soo sant ma'ri), a port city of Michigan, county seat of Chippewa County, on the Saint Mary's River, near Lake Superior. It is on the Duluth, South Shore and Atlantic, the Canadian Pacific, and the Minneapolis, Saint Paul and Sault Sainte Marie railroads and on the Sault Sainte Marie Canal. On the opposite side of the Saint Mary's River is the Canadian town of Sault Sainte Marie, with which it is connected by an international railroad bridge. Among the noteworthy buildings are the county courthouse, the public library, the high school, and a number of fine churches. Other features include Canal Park, Fort Brady, and an immense electric power plant. The manufactures include lumber, sailing vessels, machinery, tobacco and cigars, flour, furniture, leather, and hardware. It is the seat of a branch of the State fish hatchery and has a large trade in fish, lumber, and manufactures. Electric lighting, pavements, waterworks, and rapid transit are among the improvements. Extensive timber and minerals abound in the surrounding country. A mission was established here in 1641 by Jesuits, but the first permanent settlement was not made until 1662. It was incorporated in 1887. Population, 1904, 11,442; in 1910, 12,615.

SAULT SAINTE MARIE, a port of entry of Ontario, in Algoma County, on the Saint Mary's River. It is finely situated on the Saint Mary's Falls Canal and the Canadian Pacific and the Algoma Central railways, and is connected with the opposite side of the river by a bridge one mile long. The surrounding country is agricultural and has productive iron ore and copper mines. The principal buildings include the city hall, the high school, the public library, and the Cornwall and International hotels. Among the manufactures are steel rails, lumber products, and machinery. Electric lighting, waterworks, telephones, and sewerage are among the public utilities. Population, 1911, 10,984.

SAULT SAINTE MARIE CANAL, an important waterway of the United States, extending round the rapids of the Saint Mary's River at Sault Sainte Marie, Mich., and connecting Lake Superior with the Saint Mary's River. It is two-thirds of a mile long and has a fall of eighteen feet, which is overcome by two locks located side by side. These locks include the Poe lock, which is 21 feet deep, 100 feet

wide, and 800 feet long, and is the largest improvement of the kind in the world. The expense of construction was \$5,000,000. It has a larger traffic than the Suez Canal in Africa. A similar canal, but somewhat smaller, is located on the Canadian side. The latter canal carries a comparatively small per cent. of the traffic between Superior and the other waters of the Great Lakes.

SAURY PIKE (sa'ry pīk), a kind of fish belonging to the flying fishes, peculiar for its greatly prolonged body. It is covered with minute scales, has long jaws resembling a beak, and swims very near the surface, often leaping out of the water and gliding through the air for some distance. This habit, due largely to its seeking to escape the danger of attacks of larger fish and tortoises, has given it the name of skipper. Several species are native to American and European waters. The American saury pike is remarkable for its long, thin body. These fish are edible.

SAUSAGE (sa'sāj), an article of food prepared of chopped or minced meat. It is made of fat and lean meat mixed in varying proportions and is highly seasoned with salt and pepper. Some varieties are made of lean beef, which is mixed with a small quantity of fat pork and seasoned with sage or garlic, and is inclosed in a cylindrical case or skin made of the prepared intestine of some animal. Sausage is a by-product of markets and packinghouses, where trimmings of all sorts are used for the purpose. The meat is carefully chopped or minced by machinery, after which it is seasoned with salt and pepper, and machines are used to press the soft and pliable mass into skins. Stuffing machines consist of two cylinders, one for steam and the other for pressing the meat into the skins, which is done by means of a piston rod being worked by the piston rod of the steam cylinder. At the bottom of the stuffing cylinder is a tube, over which the sausage casings are slipped, and they are filled rapidly by the meat being forced through this orifice. The manufacture of sausage is one of the most profitable parts of the packing industry. The varieties of sausage are very numerous. In the United States the casings for sausages have an annual value of \$2,500,000 and the output of sausage is \$298,500,000.

SAVAGE (sav'aj), Richard, poet, born in London, England, Jan. 10, 1698; died July 31, 1743. He was an illegitimate son of Richard Savage, Lord Rivers, and the Countess of Macclesfield. He studied at the grammar school of Saint Albans and afterward became apprenticed to a shoemaker in Holbourn. When the secret of his birth was accidentally revealed to him, he quit his handicraft to turn his attention to literature. His first writings were comedies, but he is best known for his poetical works, which so impressed Lord Tyrconnel that he gave him an annual pension of \$1,000 for some years. Though

failing to become poet laureate after an earnest effort, he received a pension of \$250 from Queen Caroline. His best known writings include the poems entitled "Bastard" and "Wanderer." "Love in a Veil" and "Woman's a Riddle" are two well-known comedies. His tragedy of "Sir Thomas Overbury" is his best writing of that class. Dr. Johnson was much in his society and treated him favorably in his "Lives of the Poets."

SAVANNAH (sa-văn'a), a river of the United States, which rises near the southern boundary of North Carolina and, after a general course toward the southeast, flows into the Atlantic Ocean. It forms the boundary between South Carolina and Georgia, is 450 miles long, and is navigable for large vessels to the city of Savannah, eighteen miles from the sea, and for

small steamboats to Augusta.

SAVANNAH, the second city of Georgia, county seat of Chatham County, on the Savannah River, 15 miles from the Atlantic. It occupies a commanding site about fifty feet above sea level and has transportation facilities by the Atlantic Coast Line, the Seaboard Air Line, the Southern, and other railways. The streets are broad and straight. They are paved largely with stone, asphalt, and macadam. Magnolias, catalpas, and japonicas beautify the streets and many of the squares, hence the city has been popularly named the Forest City. Forsyth Park, a tract of ten acres in the center of the city, is one of many beautiful resorts. The Parade Ground, in the southern part of the park, has a fine Confederate monument. About thirty squares are maintained in different sections of the city, many of which contain handsome monuments, including those of Count Casimir Pulaski, Nathanael Greene, William Jasper, and William Washing-

The architecture is, in general, modern and substantial. Among the leading public buildings are the county courthouse, the customhouse, the post office, the Union Passenger Station, the Masonic Temple, the City Exchange, the De Soto Hotel, and the public library. It has numerous church edifices of historical interest and maintains many ward and several high school buildings. Among the institutions are the Savannah Hospital, the Telfair Hospital for Women, the Saint Joseph's Hospital, and the Georgia Infirmary for Colored People. It is the seat of a Roman Catholic bishopric, the Jewish Synagogue of Mickva, and the Telfair Art Gallery. Bethesda Orphanage, founded by George Whitefield in 1740, is located about ten miles from the city. The Christ Church occupies the site on which John Wesley first preached to the colonists in America.

Savannah is located in a fertile region which produces large quantities of cotton, fruits, rice, sugar cane, and vegetables. It has an extensive coastwise and foreign trade, and is one of the largest cotton-shipping ports in the United States. The river is sufficiently deep to admit the largest steamers and has been greatly improved by wharves and by dredging. It has large exports of rice, lumber, phosphate rock, cotton seed oil, tobacco, and turpentine. manufactures include fertilizers, furniture, railroad cars, confectionery, pipe tobacco and cigars, locomotives, patent medicine, and clothing. Among the public utilities are extensive systems of waterworks, sewerage, and surface drainage. Intercommunication is provided by a system of electric railways, which has branch lines to all parts of the city and many points in the adjoining country.

James Edward Oglethorpe founded a settlement in the vicinity in 1733. A large number of German colonists settled in the vicinity during the next few years, and Charles and John Wesley arrived in 1735. It was occupied by the British in 1778, who compelled the Americans to surrender, and was held by them until the close of the Revolutionary War. In 1789 it was incorporated as a city. The Savannah, which was the first steamer to cross the Atlantic, was owned and constructed by people in the city. General Sherman captured Savannah in 1864, when completing his march to the sea. At that time it had a population of about 25,000. Although the navy yard and many buildings were destroyed, it was rebuilt with rapidity, and is at present one of the leading commercial cities of the South. Population, 1910, 65,064.

SAVE (sav), a river in Austria-Hungary, which rises in the southeastern part of that country, near the boundary of Italy. After a course of 550 miles toward the southeast, it joins the Danube near Belgrade. It separates Carniola from Styria, crosses Coatia, and separates Slavonia from Bosnia and Servia. valley of the Save is highly fertile, producing large quantities of cereals and fruits. Among the principal tributaries are the Una, Drina, Bosna, and Kulpa rivers. It is navigable for 335

miles.

SAVINGS BANK, an institution for receiving and investing savings. The primary object of savings banks is to encourage thrift and the accumulation of earnings among the laboring, professional, and other classes. They pay interest on deposits at stated intervals, the interest depending on the rate of profit accruing to the bank from loaning the deposits. Savings banks originated in the latter part of the 18th century and were, in general, managed by persons seeking no remuneration for their services. The first banks of this kind in Europe were established in accordance with suggestions made by Daniel Defoe in 1697, when several small institutions were founded in England. Banks of a similar character were soon after instituted on the continent. The first large savings bank was established at Brumath, France, in 1765; another at Hamburg, Germany, in 1778; one at Berne, Switzerland, in 1787; and the first large institution of this kind in England, in 1799. These particular banks and others of a similar kind furnish depositors an opportunity to place small savings at interest, and the state is the direct security for the repayment of the amounts deposited.

It has been found that savings banks promote habits of economy among the less wealthy classes, and thus constitute a source of much benefit to society generally. The promotion of systematic saving of small earnings has been still further extended in many European countries by the establishment of post office, military, and naval savings banks. Postal savings banks were authorized in England by an act of Parliament in 1861. Depositors are provided with a deposit book. Every deposit is entered in the deposit book by the receiving officer. It is attested by the stamp of his office, and the amount is reported to the Postmaster General the same day it is received. No depositor may place savings exceeding \$150 per year and the minimum receivable at any time is 25 cents. Military and naval savings banks are designed to accommodate the frugal soldiers and sailors. Institutions of this character are maintained in several countries of Europe.

The savings banks of the United States are under the direction of private corporations. Depositors are protected by State laws in some instances, though a number of the states have not yet enacted laws of this character. However, there are building and loan associations, a form of cooperative savings banks, in most of the states. These institutions take the place of savings banks in many respects, but money is loaned only to members on improved real estate security. The first savings bank incorporated in the United States was the Boston Provident Savings Institution, in 1816, and the same year was founded the Philadelphia Savings Fund Society, but it was not incorporated until 1819. More than a thousand similar institutions are maintained at present in the United States, all of them resembling the common plan in receiving deposits and paying a rate of interest according to the profit from loaning the deposits. Depositors are provided with a pass book, in which all sums of money deposited by individuals, corporations, or societies are entered, and in it is made an account of the withdrawals

The laws of some states provide that depositors shall be amply secured, and others have provisions which limit the amounts that may be deposited by any one person. In some cases the laws exempt from liens and executions the deposits made by minors and females. These banks are limited in some states by statutory law as to the character of investments that may be made with the deposits, and the amount that is to be invested in proportion to the receipts of the bank. In most states provisions have been made for the examination of the condition of the banks at regular intervals. Only ten

savings banks were maintained in the United States in 1820, in which \$1,138,576 were deposited by 8,635 persons.

In 1912 there were 90,650,542 depositors in the savings banks of the world and the total deposits amounted to \$18,682,942,510. The latest report shows the following interesting facts regarding the savings banks of the leading countries of the world:

	NUMBER DEPOSITS.	TOTAL DEPOSITS.	AVERAGE DEPOSITS.
Australia	1,086,018	\$164,161,981	\$151.15
Austria	4.946,307	876,941,933	177.29
Belgium	2,088,448	141.851.419	67.92
Canada	213,638	60,771,128	289.14
Denmark	1,203,120	236,170,057	196.29
France	11.298.474	847,224,910	75 01
Germany	15,432,211	2,273,406,226	147.38
Holland	1.330,275	72,738,817	54.83
Hungary	1,717,515	432,810,515	251.91
India	866,693	34,656,371	39.98
Italy	6,740,138	482,263,472	71.55
Japan	7,467,452	40,887,186	5.48
New Zealand	261,948	38,332,823	146.34
Norway	718.823	89,633,481	124.69
Rumania	145,507	7,426,031	51.04
Russia	4.950.607	445,014,951	89.90
Sweden	1.892.586	151,480,442	80.54
Switzerland	1,300,000	193,000,000	148.46
United Kingdom	11.093,469	966,854,253	87.15
United States	9,142,908	4,070,486,247	445,20

SAVONAROLA (sā-vō-nà-rō'là). lamo, eminent reformer and statesman, born at Ferrara, Italy, Sept. 21, 1452; died May 23, 1498. He descended from a noble family, received early instruction under efficient tutors at home, and in 1474 was sent to Bologna, where he entered the Dominican Order. After studying Greek philosophy and theology, he was sent to Saint Mark's Convent at Florence and began to preach there in 1482. Though spiritually strong, he possessed a harsh and unpleasant voice, which caused his lectures to be poorly attended. Soon after he was sent to the convent at Brescia, where he overcame his former defects and attained such fame as a preacher and theologian that he was recalled to Florence in 1489, where he became prior of Saint Mark's in 1491. His sermons were directed against the vices and luxuries practiced by the wealthy at Florence and he foretold that desolation would be spread in Italy by the invasion of foreign enemies, a prediction verified in 1494 by the entrance into Italy of Charles VIII. of France.

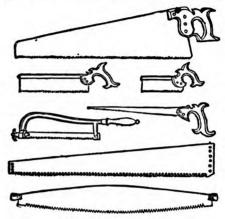
At that time Savonarola was favored by both the government and the church, and his eminent ability induced the Pope to appoint him vicar-general of the Dominican monks in 1493. In that capacity he labored successfully to make the order better and purer. As he was dissatisfied with the aristocratic government of Florence under the Medici family, he welcomed the French under Charles VIII. when invading Italy, and joined a committee to invite him to Florence. The city soon fell under the attacks of the French, and, when the army of France was compelled to withdraw from Italy, Savonarola organized a republic, which was

governed by two councils and a signory. Though he held no office, he was in fact the most potent influence in the new government. Not content with reforming Florence, he began to organize a crusade to revolutionize the Roman court and to place the clergy on a more satisfactory basis. He wrote the Christian princes with the view of securing their assistance, charging that the church was corrupt and suggesting that a general council should be convoked to secure relief from oppressive practices,

While the followers of Savonarola looked upon him as a prophet, the church became arrayed against him, and at length Pope Alexander VI. excommunicated him by issuing a bull. This was read in the Florence cathedral in 1497, and Francesco di Pugli, a Franciscan friar, publicly denounced him. Difficulties began to deepen, both in the church and government, and finally the ordeal of fire was agreed upon to test the truth of the pretentions of Savonarola as to having divine power, A disagreement caused the plan of carrying out the ordeal to fail, and he withdrew to Saint Mark's Convent, where he was arrested by a mob and cast into prison. In the meantime the city government passed to those opposed to Savonarola. Thus deserted by church and state, he was put through a mock trial with torture and condemned to die as a heretic. He and two other Dominicans named Silvestro Maruffi and Domenico Buonvicini, were strangled at Florence on May 23, 1498, and the bodies were burned. Writers generally agree that Savonarola was a man of remarkable genius, and an enthusiastic and devoted reformer. His writings are very numerous, both in the Latin and Italian, the principal works embracing "Simplicity of the Human Soul," "Perfection of the Spiritual Life," "Triumph of the Cross," "Treatise on Humility," "Mysteries of the Mass," "State of Widowhood," and "Love of Jesus Christ."

SAVOY (sa-voi'), House of, a distinguished royal house of Europe, which is now represented in Italy by the reigning dynasty. It may be said to be traceable back to the year 407 A. D., when the small territory of Savoy was seized by the Burgundians from the de-clining power of Rome. Emperor Henry V. bestowed the title of Count of Savoy on Amadeus III. in 1111 and Emperor Sigismond, in 1416, made Amadeus VIII. the first Duke of Savoy. From 1485 the dukes of Savoy claimed to be kings of Cyprus and Jerusalem, but the title of king was not generally recognized until the Treaty of Utrecht was concluded in 1713. That treaty ended the War of the Spanish Succession and gave to Victor Amadeus II. the island of Sicily and a part of the duchy of Milan, and conferred upon him the title of king. He was compelled to surrender Sicily to Austria in 1720, but received in exchange the island of Sardinia, which, along with his other possessions, was erected into the kingdom of Sardinia.

SAW, an instrument with a tempered steel blade and pointed teeth arranged continuously, used to cut wood, stone, metal, or other substances. Many kinds of saws are employed in the arts and industries, their form, size, and shape depending upon the uses for which they are intended. The smallest are those used in surgical and dental operations, from which they



SOME FORMS OF SAWS.

range to the great saws employed in sawmills for cutting the largest timber. The best saws are of tempered steel, ground smooth and bright, and the teeth are either cut, filed, or punched, but in larger ones, especially circular saws, inserted and removable teeth are employed to a considerable extent. To manufacture a firstclass saw it is necessary to secure uniform thickness in the blade. It is required to have elasticity sufficient to spring back into shape, if bent into a bow by accident. The teeth are sharpened with a triangular file, the blade of the saw being first fixed in a whetting block. When inclined forward or backward, they are said to rake, and to give better clearance the teeth are alternately inclined laterally, hence they cut a little wider than the blade. This is called the set.

The two general classes of saws are known as handsaws and machine saws, and of each there are numerous kinds. Handsaws are variously named, according to the uses they serve. The most common forms include the panel saw, meat saw, ripping saw, frame saw, keyhole saw, tenon saw, dovetail saw, and sash saw. All these are for use by one person, and the blade tapers in width from the handle. The crosscut saw is intended for two persons, having a handle at each end, but there are forms of the crosscut saw designed for use by one person. A circular saw consists of a disc having sawteeth cut or fixed in its periphery. It is mounted on an arbor, with which it rotates, usually at a high speed. The circular saw is used in sawmills, often one saw above another, and the log is pushed against it by means of

a traveling platform. This saw is likewise employed for cutting across blocks of wood, as cutting cordwood for fire lengths.

Three forms of sawing machines are used in the sawmills, including the circular, band, and straight saws. Where large logs are cut, two circular blades instead of one are used, the advantage being that lumber may be cut with greater rapidity, while timber may be saved in that the kerf, or groove, can be less wide. Besides, two saws arrayed in this way make it possible to drive them faster and secure a truer cut. A bandsaw is one made by placing a thin endless saw like a belt over two wheels, the band passing rapidly and operating on the material moving against it, either by hand or on a platform. Bandsaws are used largely for resawing, and a saw deflector is often used to keep the belt in line. Straight saws are of two kinds, the drag saw for cutting a log in two, and the jig saw for light ornamental work. Circular blades are used largely in metals; some are toothed, while others are plain, the friction of rapid rotation cutting the metal. Toothless blades are used quite largely in marble and other stone. Many saws have come into use for special purposes, such as are employed for rabbeting and cutting weatherboards and for circular and ornamental work. Sawmills are large establishments for sawing logs into lumber by power, either steam or water power being used. It may be said that sawmills are comparatively modern, the earliest having been built at Augsburg, Germany, in 1322. The first one set up in England was built by the Dutch in 1663, near London, but prejudice against labor-saving machinery caused the populace to destroy it. The sawmills of Canada and the United States constitute a vast industry, millions of feet of lumber being cut for domestic use and exportation.

SAWFISH, a genus of fish bearing resemblance both to the sharks and rays, but distinguished by having a long beak or snout.



COMMON SAWFISH.

They attain a length of from ten to twenty feet and may be counted among the most savage of fish. The beak is often six feet long. It has from 16 to 28 pairs of teeth set horizontally in sockets, and is used to rip or tear open its prey. Sawfish have been known to inflict mortal wounds on whales. Their flesh is too coarse to be eaten. Many species have been enumerated. The common sawfish, native to the Atlantic from New Brunswick to Florida, is the best known.

SAWFLY, the popular name of a class of insects that deposit their eggs in holes cut into vegetable tissues. They are so named from the sawlike apparatus with which the females are supplied, which they use in conveying the eggs into these openings. The female deposits one egg in each perforation, together with a peculiar fluid, which gives rise to a small swelling or enlargement to accommodate the larva. Most of the species, of which there are about 2,000, are native to the temperate regions. Some species are very injurious to the leaves and fruit of cultivated trees, while others are pests to wheat, barley, grapes, and other plants. Cimbex Americana, the largest species of North America, lays eggs in the leaves of birch, elm, and willow trees. Others attack the rose,

currant, and pear trees.

SAWYER, Thomas Jefferson, teacher and clergyman, born in Reading, Vt., Jan. 9, 1804; died July 24, 1899. He graduated from Middlebury College in 1829, and from 1830 to 1845 was a Universalist pastor in New York City. While there he edited the Christian Messenger. In the latter year he was appointed principal of the Liberal Institute, at Clinton, N. Y., where he taught classes in theology until 1852, when he resumed pastoral work in New York City, continuing until 1861. From the latter year until 1869 he taught theology at the Liberal Institute, when he was chosen professor at Tufts College, Medford, Mass. Sawyer defended the doctrines of Universalism in various writings and discussions and brought profound scholarship and culture to its support. His writings include "The Endless Punishments," "The Doctrine of Universal Salvation," and "Who is Our God-the Son, or the Father?"

SAXE (săks), John Godfrey, poet, born in Highgate, Vt., June 2, 1816; died March 31, 1887. After graduating at Middlebury College in 1839, he studied law at Saint Albans. Vt..

where he was admitted to the bar in 1843. He established a successful practice in Franklin County, served as attorney in Chittenden County, and was superintendent of common schools for two years. From 1850 to 1856 he edited the Burlington Sentinel, was attorney for Vermont one year, and in 1859 and 1860 was an unsuc-

cessful candidate on the Democratic ticket for Governor of Vermont. Saxe wrote many poems and was greatly in demand as a lecturer, especially at school and college commencements. The later years of his life were spent in Albany, N. Y., at the home of his son. His principal writings include "Clever Stories of Many Nations," "Proud Miss McBride,"
"Money King and Other Poems," "Fables and Legends of Many Countries," "Masquerade," and "Leisure Day Rhymes." He contributed extensively to the Atlantic Monthly, Harper's Magazine, and Knickerbocker Magazine.

Magazine, and Knickerbocker Magazine. SAXE, Maurice, Marshal, eminent soldier, born at Goslar, Germany, Oct. 28, 1696; died Nov. 30, 1750. He was a son of Augustus II., elector of Saxony, and the Countess of Königsmark. In 1708, when only twelve years old, he was induced by his fondness for military life to leave home and join the army of Marlborough in Flanders, with which he was present in the capture of Lille and the siege of Tournay. He joined the Russian army stationed in Poland in 1711, taking part in the Battle of Riga, but in 1714 returned to his home in Dresden, Germany. After obtaining a pension from his father, he went to Paris in 1720 to study military tactics, and in 1726 became Duke of Courland, from which he was compelled to retire after resisting the allied Russians and Poles for three years. His brother, Augustus III., succeeded his father to the throne of Saxony and offered him command of the Saxon army, but he declined and accepted in its stead a command in the army of France. For distinguished services at Ettingen and Philippsburg he was made Marshal of France, in 1744. He commanded the French army in Flanders with superior tact in 1745, and gained a victory over the English under the Duke of Cumberland at Fontenoy. In 1746 he defeated the allies at Roncoux and the following year was victorious over their forces at Lawfeld, Bergenop-zoom, and Maestricht. The Peace of Aix-la-Chapelle soon followed. It may be said that the decided advantages gained by France are due largely to the military genius of Saxe. Soon after he took up his residence on his estate at Chambord, France, where he died of dropsy

SAXHORN (săks'hôrn), a wind instrument much used in military bands. It was invented at Paris, France, in 1842 by Adolph Sax, a native of Belgium. It has a long, winding tube with a wide, bell-shaped opening, is supplied with from three to five valves, and possesses a large compass with full, rich tone. Several sizes and varieties are in use, thus supplying the necessary instruments to make up a whole band, but the tone is not sympathetic enough for fine orchestral use. Military music has been much influenced by the saxhorn and another instrument by the same inventor called the saxophone. The latter has a clarionet mouthpiece and a single reed. Its body is a parabolic cone of brass provided with a set of keys. It is of value in military bands and, like the saxhorn, is easily learned and carried.

SAXIFRAGE (săks'i-frāj), an extensive genus of hardy perennial herbs, with alternate leaves and simple flower stems. They are distinguished by a many-seeded capsule, have leaves six to seven inches long, and the stalks are one to two feet high. The flowers are yellow, white, or red, and most of the plants grow in rocky places, to which their clustered roots are well adapted. About 160 species have been described, many of them being domesticated for ornamental garden plants, and fully 50 are native to America. Plants of this genus are confined largely to the colder and temperate parts of the Northern Hemisphere. A species known as beefsteak, or strawberry, geranium, is a common house plant.

SAXONS (săks'ŭnz), one of the races of people that originally inhabited the northern part of Germany, called Sachsen in the German. They are first mentioned in history by Ptolemy, in whose time they occupied a large region between the Elbe, Trave, and Eider rivers. By the 3d century of the Christian era their numbers had increased materially and they organized themselves into a confederation, which occupied the northwestern part of Germany. Subsequently they formed an alliance with the Franks. They invaded Roman territory in the times of Emperors Julian and Valentinian, and about the same time made settlements on the coasts of Gaul and Britain. It is probable that the first Saxon settlements were made in Britain as early as 287, but their union with the Angles and Jutes appears to have been formed about 450, and about that time they conquered a large region of that island, giving to the people of England the name of Anglo-Saxons. Their principal settlements in England were in Sussex, or South Saxon, and Essex, or East Saxon.

The Saxons remaining in Germany occupied a vast region that became known as Alt Sachsen, or Old Saxon, but its limit cannot be easily defined, since frequent wars against invading tribes changed the boundaries at various times. It may be generally defined as including the country inclosed by the North Sea, the Hartz Mountains, the Rhine, and the Elbe. In 531 they fought under an alliance with the Franks against the Thuringian kingdom, which they subdued and destroyed, and in consequence added it to their possessions. In 719 a prolonged war arose between the Saxons and the Franks, which terminated in 804 by Wittikind, the last Saxon king, submitting to the Franks under Charlemagne. At that time they gave up paganism and adopted Christianity as their religion. See Saxony.

SAXONY (sāks'ūn-ĭ), a kingdom of Germany, lying north of Bohemia and east of Silesia. The length from east to west is about 135 miles; breadth, 75 miles; and area, 5,788 square miles. Practically all of Saxony lies in the Elbe basin, being drained by that river and its tributaries, the Elster, Mulde, and Spree rivers. A small part in the east is drained into the Oder by the Neisse. It is separated from Bohemia by the Erzgebirge and slopes gradually toward the north, most of the surface

being fertile and undulating.

SAY

2543

Products. The country has valuable deposits of granite, iron, silver, tin, nickel, lead, bismuth, cobalt, zinc, arsenic, antimony, and coal. mines are among the most important of Germany, especially those producing iron and coal. The soil products embrace cereals of all kinds, vegetables, pears, apples, plums, and grapes. Horned cattle, horses, milch cows, swine, sheep, and poultry are produced in abundance. The manufactures include large quantities of cotton and woolen goods, ribbons, silk textiles, pottery, leather, chemicals, and machinery. Saxony is traversed by a large number of railroads, including a total of 2,125 miles, and it has excellent highways and numerous telephone and telegraph lines.

GOVERNMENT. Saxony is divided for governmental purposes into the four districts of Leipsic, Dresden, Bautzen, and Zwickau. It is a constitutional monarchy, under the constitution of the German Empire. The crown is vested in the Albertine line. It has a legislative assembly of two houses, the higher chamber of which is formed of princes of the royal family, nobles, proprietors, and representatives of the universities, while the lower chamber is constituted of deputies from the towns and rural communes. Lutheran is the state religion, but all religious forms are tolerated. The University of Leipsic is the recognized head of its educational affairs. It has an excellent system of public schools, including kindergartens, elementary schools, gymnasia, and Real-schulen. The government owns practically all the railroads and telegraph lines, and fosters agricultural and industrial arts by the maintenance of institutions of learning devoted to special lines. All male citizens are required to serve three years in the army, but in addition are classed for four years in the reserve and five in the Landwehr. The kingdom has four votes in the federal council of the German Empire and is entitled to 23 deputies in the Reichstag. Dresden is the Other important cities are Leipsic, Plauen, Chemnitz, Freiberg, and Zwickau.

HISTORY. The people of Saxony are descendants from the Sachsen, or Saxons, and the reigning dynasty descended from Wittikind, the last Saxon king, who was conquered by Charlemagne in 804. At that time they became a part of the German Empire, but the territory now included in Saxony does not correspond to the region then occupied by them, when it was farther toward the north. It was made a dukedom in 880, when Otto became the first duke, reigning until 912. He greatly extended the territory by conquests from the Normans and his son, Duke Henry (912-936), became Emperor of Germany in 919. duchy passed to the Bavarian branch of the Guelph family in 1127, and Rudolph II. (1356-1370) assumed the title of Elector of Saxony.

John George I. (1611-1656) sided with the Protestants in the Reformation and joined Gustavus Adolphus, his army taking part in the battles of Bridenfeldt and Lützen. Frederick Augustus I. (1694-1733) embraced Catholicism in 1697 to become King of Poland, since which time the court of Saxony has been Roman Catholic, but the state religion has re-Frederick Augustus II. mained Protestant. (1733-1763) joined the War of the Austrian Succession against Maria Theresa. During the Seven Years' War the country was ravaged, and it was many years before prosperity was fully restored. Frederick Augustus III. (1763-1827) first fought against France, but his army went over to Napoleon's side after the Battle of Jena, and he received in return the title of king, and large additions of territory.

Saxony became the battle ground between Napoleon and the allies in 1813. Within its confines were fought the decisive battles of Lützen, Dresden, Bautzen, and Leipsic. When the Congress of Vienna, in 1814, adjusted the division of territory, a large part of Saxony was turned over to Prussia. Peace was not disturbed after that until the Revolution of 1848-49, but in the Austro-Prussian War of 1866 Saxony sided with Austria, and was immediately invaded by a Prussian army. After the war Saxony became incorporated with the North German Confederation, since which time it has enjoyed remarkable prosperity in railroad building and manufacturing enterprises. When Napoleon III. declared war against Prussia, in 1870, Saxony rallied to the support of the German states, its present king, Albert, commanding the army of the Meuse. In 1871 it became a part of the German Empire. Population, 1905, 4,508,601; in 1910, 4,802,485.

SAXTON (săks'tŭn), Joseph, inventor, born in Huntington, Pa., March 22, 1799; died in Washington, D. C., Oct. 26, 1873. After attending the public schools, he became apprenticed to a watchmaker and soon after removed to Philadelphia. There he invented a machine for cutting the teeth of watch wheels, an invention that has revolutionized the art of making watches and clocks. He constructed the clock for the tower of Independence Hall. In 1828 he went to England, where he remained until 1837, and while there constructed a magnetoelectric machine and a locomotive differential pulley. After returning to the United States, he became superintendent of the responsible work of constructing the machinery and balances for the United States mint at Philadelphia. His later inventions include an immersed hydrometer, a deep-sea thermometer, and a self-registering time gauge.

SAY, Jean Baptiste Léon, statesman, born in Paris, France, June 6, 1826; died April 21, 1896. He secured a liberal education, made political economy a special study, and after the fall of Napoleon III. supported the republic. In 1871 he became a member of the national assembly, was made minister of finance by M.

SAYCE

Thiers the following year, and in 1875 was again appointed to the portfolio of finance in the administration of M. Buffet. This position he held in the succeeding administrations, and in 1880 became ambassador to London, but returned to Paris a few weeks later in consequence of having been elected president of the senate. He wrote a number of excellent works on history and political economy, and in 1880 was honored by membership in the Academy

of Moral and Political Sciences.

SAYCE (sās), Archibald Henry, Oriental traveler, born near Bristol, England, Sept. 25, 1846. He studied at Grosvenor College and at Oxford, and became tutor at Queen's College in 1870. In the same year he took orders in the Anglican Church, and six years later became deputy to Max Müller as professor of philology, a position he held until 1890. In the latter year he visited Egypt, where he Among his studied Egyptian inscriptions. writings are "Fresh Light from the Ancient Monuments," "Principles of Comparative Philology," "Ancient Empires of the East," "Assyrian Grammar," "Chaldean Genesis," "Higher Criticism and the Verdict of the Monuments," "Races of the Old Testament," and "History of Babylonia.

SAYRE (sā'ēr), a borough of Pennsylvania, in Bradford County, 58 miles northwest of Scranton. It is on the Susquehanna River and the Lehigh Valley Railroad, and is surrounded by a coal-mining and agricultural region. The chief buildings include the high school, the Packer Hospital, and the public library. Electric lighting and waterworks are among the public utilities. The manufactures include machinery, hardware, clothing, and farming utensils. The region was settled in 1840. Sayre was incorporated in 1891. Population, 1900,

5,243; in 1910, 6,426.

SCAB, a contagious disease common to sheep, but which also attacks horses and cattle. It is due to a minute insect burrowing in the skin, causing baldness and itching. The disease is favored by dirt. Among the remedies are turpentine, mercurial ointments, tobacco water, and solutions of arsenic. The remedies should be carefully applied and repeated a number of times

SCABBARD FISH (skab'berd), a fish of the mackerel family, distinguished by having a continuous spinous dorsal fin. The body is elongated, the teeth are pointed and cutting, and the caudal fin is forked. Several species grow to a length of five or six feet. swim with much velocity, waving through the water like a long and wide ribbon of silver, displaying beautiful reflections with the change of light.

SCALE, in music, the regular succession of notes arranged in the order of pitch. In its simplest form the scale consists of seven steps or degrees, counted from a root or prime up-

ward in regular order, and to this series is added the eighth to complete the octave. The same notes constitute the descending scale when the motion is reversed. To this may be added other notes, either above or below, in a continuous order to form seven, eight, or more octaves. The tones and semitones of the octaves in their natural order constitute the diatonic scale, as A, B, C, D, E, F, G, A In modern music only two varieties of the diatonic scale are in use, namely, the major and the minor, but other diatonic scales were used in ancient music. However, one semitone greater in the major than in the minor is called the third diatonic scale. A scale is major when the interval between the keynote and the third above it consists of two tones, as from C to E, and it is minor when the interval between it and its third consists of a tone and a half, as

from D to F.

SCALE INSECT, the common name of a class of destructive insects, frequently called bark louse, or scale bug. They are distinguished in that the female is wingless, that both sexes have legs which terminate in a single claw at the tip of a tarsus, and that the male has two wings. The body is covered with small scales, which in some species are naked and in others are covered with minute hair or These insects gather in large minute down. numbers on plants and injure them by sucking They are especially harmful to the juices. hothouse plants and many fruit-bearing trees. Some of the species produce several broods in a year. Alkaline washes are effectual in checking their ravages, both within and without the greenhouse. In some states and countries it is required that nursery stock must be examined by an official before it can be sold, this precaution being necessary to protect orchards from scale insects. Young trees that contain these pests may be fumigated with hydrocyanic acid.

SCALES, the name applied to protective plates that arise from the skin of various animals, such as fishes and snakes. The purpose of such scales is to protect the body. In lizards and snakes the scales are formed by the cutis, but they are attached to the skin and adhere to it when the latter is shed. Some lizards are almost without scales, while in some animals they are so small that they can hardly be seen without the microscope. Some mammals are scaly, such as the scaly ant-eater and the scaletailed squirrel. The term scale is applied in botany to the bracted leaves which protect the delicate organs of plants, as in the leaf buds of some species during the winter.

SCALLOP (skŏl'lŭp), the name of several species of shellfish, so called from their round, ribbed shell with scalloped edges. They are classed as bivalves, having shells connected at the upper side with a hinge. The shells are fan-shaped and have numerous green eyes on

the inner fold or mantle. The animal is enabled to swim by means of a little air bag inside, and it is facilitated in movement by opening and shutting its shell. Young scallops are frequently



COMMON SCALLOP.

seen swimming in the water, but the older animals attach themselves to rocks, where they remain stationary like oysters. The term scalloped oysters was derived from the circumstance that the shell was used frequently in cooking oysters. Scallops abound in almost all seas, about 200 species

being known, many being edible. In the Mediterranean, off the coast of 'Palestine, scallops are quite abundant and were caught from remote antiquity, their shells being converted into souvenirs for those visiting the Holy Land. A number of species are abundant off the coasts of New England and the Middle States, where they are caught extensively for food.

SCALP, the skin forming the outer covering of the skull. It is quite the same as the skin growing on other parts of the body, differing from it only in having a more prolific growth of hair, and being composed of an expanded muscular tendon in addition to the ordinary skin, through which many blood vessels permeate. The term scalp is generally applied to all the part of the skin of the head which is covered with hair. Formerly the American Indians used the scalping knife to remove a part of the scalp from those killed or taken captive in war. Frequently the victim was alive when the scalp was being removed. Indian warriors who secured the greatest number of scalps were highly honored, and it was a matter of pride to wear a large number as trophies dangling from the belt.

SCAMMONY (skām'mō-nỹ), the name of a twining plant found in various parts of Europe and Asia, especially in Greece and Asia Minor. The root is a tuberous and tapering growth, from three to four feet in length, and contains a milky juice. When a fresh root is cut, the juice exudes and later dries into a slate-colored lump, which constitutes the cathartic drug known as scammony. It is a resin and has been used as a medicine from a remote period. Scammony is commonly administered in combination with other purgatives, since it is quite harsh and violent if taken alone.

SCANDERBEG (skăn'dēr-bēg), patriot and prince of Albania, born in Croia about 1404; died at Alessio, Jan. 17, 1468. His proper name was George Castriota, being the son of John Castriota, but Scanderbeg is the name applied to him by the Turks, meaning Alexander Bey.

The Turks took him a captive when seven years old. His physical beauty and intelligence so pleased Sultan Amurath II. that he was brought up in his palace in the Moslem faith. He received instruction in the Turkish, Slav, Arabic, and Italian languages, and upon reaching maturity was put at the head of a Turkish army. In 1433 he greatly distinguished himself as a Turkish pasha. Soon after he learned that his father's estate had been confiscated, when he resolved to return to his native land. He accordingly deserted the Turkish army in 1443, taking with him a number of Albanians, and renounced the faith of the Moslems. All of Albania was soon in arms under his leadership. and with an Albanian army of 15,000 he repeatedly defeated the Ottoman forces. hammed II. took the field against him in person, but was obliged to accept terms of peace. It was the ambition of the Pope to secure a powerful Christian alliance to aid Scanderbeg, but failing in this the latter maintained the independence of Albania for 24 years, and in the meantime defeated the Turks in 22 battles. The Turks reduced Albania shortly after his death.

SCANDINAVIA (skăn-dǐ-nā'vǐ-à), anciently the name of the region now included in the kingdoms of Sweden, Norway, and Denmark.



SCANDINAVIA.

At present it is variously applied to the language and literature of the people occupying this region and Iceland. The Scandinavian Peninsula is situated in the northwestern part of Europe. It is bounded on the east by Finland, the Gulf of Bothnia, and the Baltic Sea, south by the Skager-Rack and Cattegat, west by the Atlantic, and north by the Arctic. It

is 1,240 miles long, from 225 to 260 miles wide, and has an area of 298,000 square miles. The two kingdoms of Sweden and Norway occupy the whole of the peninsula, and south of it, across the Skager-Rack and Cattegat, is the kingdom of Denmark. A Teutonic people occupied most of the region in the early historic period of Europe. The inhabitants of the territory now included in Denmark and Schleswig were known to the Romans by the name of Cimbri, and the region occupied by them, as the Cimbrian Peninsula. In the 9th century large numbers of Vikings or Northmen moved in their galleys along the coasts of Northern Europe, visiting England, France, Germany, Spain, and Italy. In these movements they plundered cities and the coast regions, but founded new states and materially influenced the industries and the language. Scandinavian literature includes a number of valuable productions, the most notable being the Sagas and Eddas. See Iceland.

SCAPULA (skap'û-la), the shoulder blade, a triangular bone of the upper extremity, forming a part of the shoulder. In form it is flat and irregular, suitable for the attachment of many muscles. In man it is located back of the chest. It is not fully ossified until the age

of 25 years. SCARABAEUS (skăr-à-bē'ŭs), an extensive genus of insects, including about 3,000 species. The greater number are native to the tropical regions, but species of the genus are found in nearly all countries. Those found in the warm climates include the largest of beetles and the size decreases with the colder latitudes, those found in Central North America and Europe being comparatively small. The dung beetles are well known types of this class of insects. They are useful in warm and temperate countries for their habit of removing offensive matter, which they roll in the form of balls. They often lay their eggs within the balls and bury them below the surface. The sacred scarabaeus of Egypt is another familiar kind. It is still the type for the Egyptian scarab, an ornament made in the shape of a beetle of hard stone or gems. This beetle was worshiped by the ancient Egyptians. It was embalmed for centuries. Many of the tombs and monuments of Egypt contain representations, and they are often accompanied by hieroglyphics. Many scarab gems were also engraved by the Greeks and Etruscans.

SCARFOGLIO, Signora. See Serao, Matilda.

SCARLATINA (skär-là-te'nà), or Scarlet Fever, an infectious specific form of fever. It is most prevalent among children, but occurs at any age. Scarlatina consists of an inflammation of the skin and extends along the mucous membrane of the throat. It is attended by a contagious fever and is followed on subsidence of the fever by scaling off of the cuticle. Three

more or less distinct forms are recognized, all requiring careful attention. Scarlatina simplex is a mild form of scarlet fever, but sometimes merges into more complicated ailments. Scarlatina anginosa is a form with intense fever, extensive ulceration of the throat, and livid rash. Scarlatina maligna is a form of the disease in which all the morbid conditions are distinct and usually proves fatal. Headache, shivering, frequent pulse, loss of appetite, and flushed face are among the early symptoms of the disease. Eruptions about the size of a pinhead appear on the skin the second or third day, when the throat is largely affected and the tonsils become swollen. Since it appears as an epidemic, it includes both mild attacks and epidemic forms uniformly severe.

SCARRON (ska-rôn'), Paul, novelist and humorist, born in Paris, France, in 1610; died Oct. 16, 1660. He studied to enter work in the church, but soon gave himself up to a gay and dissolute life. Nervous diseases caused him to become crippled and distorted at an early age. He then applied himself to literature and soon acquired a reputation by his caricatures and humorous sketches. The Queen of France gave him a pension from her private purse and he was aided by the Bishop of Le Mans, which enabled him to make his house the favorite resort of men and women who were fond of literature. In 1652 he married Françoise D'Aubigné, who afterward became the mistress of Louis XIV. as Madame de Maintenon. He is the author of numerous comedies and burlesques. His writings were translated under the title "The Comical Works of Scarron."

SCHADOW (shā'dô), Johan Gottfried, sculptor, born in Berlin, Germany, May 20, 1764; died Jan. 28, 1850. He studied drawing and sculpture in his native city and at Rome, and in 1788 became professor at the Berlin Academy of Art. Much of his time was spent in traveling in Southern Europe, but he continued to live at Berlin, where he executed many celebrated works of art. Few modern sculptors have exceeded him in the number of important works, especially in making large figures, and he is surpassed by none in producing representations of individual truths and historical exactness. Among his statues are those of Luther at Wittenburg, Blücher at Rostock, and Frederick the Great at Stettin. His monuments include "Frederick the Great with His Greyhounds," "Hercules Slaying the "Quadriga of Victory," "Crown Centaur," Princess Louisa and her Sister," and "Girl Reposing.

SCHAFF (shäf), Philip, American clergyman, born in Coire, Switzerland, Jan. 1, 1819; died Oct. 20, 1893. After studying at the German universities of Tübingen and Halle, he took an extended course in Berlin, where he began to lecture on theology in 1842. The next year he was recommended to fill a professor-

ship of church history in the Theological Seminary at Mercersburg, Pa., an institution belonging to the German Reformed Church. He entered upon this work with marked success in 1844, was sent to represent his church at the ecclesiastical diet at Frankfort, Germany, in 1854, and in 1862 became lecturer of Andover Seminary. After serving in that capacity until 1870, he was made professor in the Union Theological Seminary, New York City, where he lectured with remarkable energy until 1893. Schaff served as president of the American committee on Bible revision in 1871, visited Palestine in 1877, and was the first president of the American Society of Church History, an organization formed in New York in 1888. His last public discourse was delivered in 1893 before the parliament of religions in Chicago. Among his writings are "History of the Christian Church," "Creeds of Christendom," "History of the Apostolic Church," and "The Person of Christ." A number of his writings have been translated into French, Greek, Italian, Bulgarian, Chinese, Japanese, Hindustani, and

SCHAFFHAUSEN (shäf-hou'zen), a city of Switzerland, capital of the canton of Schaffhausen, 25 miles north of Zurich. It is finely situated on the Rhine, has electric and steam railway facilities, and is the center of a large trade in produce and merchandise. The chief buildings include the townhall, the museum and library, the theater, and several fine schools and churches. Two bridges cross the Rhine and connect it with Feuerthalen, on the opposite side of the river. It has manufactures of watches, textiles, machinery, pottery, and scientific instruments. Schaffhausen was long a free city, but joined the Swiss Confederation in 1501. The early growth is due to the famous falls of the Rhine, which descends nearly 100 feet in passing over three ledges. Most of the people are Protestants. Population, 1910, 18,196.

SCHAUFFLER (shouf'ler), William Gottlieb, eminent missionary, born in Stuttgart, Germany, Aug. 22, 1798; died in New York City, Jan. 26, 1883. After studying for some years in Germany, he conducted missionary work in Turkey, and came to the United States in 1827. Later he entered Andover Seminary to take a course in theology and soon after again entered the missionary work, making it a specialty to labor among the Jewish people. His principal field of activity was in Constantinople, where he spent forty years among the Jews and Armenians. While there he translated portions of the Bible into the Turkish and Hebrew-Spanish languages. Few missionaries have been as successful in learning languages and none have wielded a wider personal influence than he. His writings show that he mastered fully twenty tongues sufficiently to read them with accuracy and he spoke ten of them fluently. Among his chief writings are "The Trumpeter of Sackingen," "Essays on the Right Use of Property," "Meditations on the Last Days of Christ," and "Songs of the Time of Heinrich von Osterdingen."

SCHECHTER (shěk'ter), Solomon, eminent scholar, born in Fokshani, Rumania, in 1847. He studied at universities in Vienna and Berlin, and in 1892 was made professor at Cambridge University, England. In 1894 he lectured at Gratz College, Philadelphia, and about the same time visited many places of interest in the United States. He went to Cairo, Egypt, to study Jewish literature, and while there discovered parts of the Jewish original of Ecclesiasticus On returning to England, he was awarded a degree by Cambridge University and subsequently was professor of Hebrew College, London. In 1904 he was made president of the Jewish Theological Seminary in New York City, beginning active service the following year. His publications include works entitled "Studies in Judaism," "Wisdom of Ben-Sira,"

"Abot de Rabbi Nathan," and "Saadyana." SCHEELE (sha'le), Carl Wilhelm, eminent chemist, born in Stralsund, Germany, Dec. 19, 1742; died May 21, 1786. He was apprenticed to an apothecary in Gothenburg, Sweden, where he secured his early knowledge of chemistry, and in 1767 located as an apothecary in Stockholm. In 1770 he removed to Upsala, where he carried on extensive investigations in chemistry. At that time he announced discoveries that placed him in the front rank of original investigators. His chief discoveries were tartaric acid, in 1770; chlorine and baryta, in 1774; oxygen, in 1777; and glycerin, in 1784. Oxygen had already been discovered and made known by Priestley, but Scheele was not aware of that fact at the time he announced its properties. He discovered arsenite of copper while experimenting on arsenic and its acid, which is generally known under the name of Scheele's green. He was an associate of the Academy of Stockholm, through which he communicated his discoveries from time to time. His principal writings include "Chemical Treatise on Air and Fire" and "Coloring Matter in Prussian Blue."

SCHEFFER (shĕf'fĕr), Ary, eminent painter, born in Dordrecht, Holland, Feb. 12, 1795; died near Paris, France, June 15, 1858. He studied drawing in his native town, but later took a complete course in Paris, where he produced his first work in 1812. His paintings were influenced largely by Goethe, Byron, and Dante, from whose writings he selected many of his early subjects. These he beautified by a subtility and grace of imagination that made them highly popular, and many of them have been engraved in a number of European countries. His most noted paintings include "Faust in his Study," "Margaret at the Well," "Dante and Beatrice in Heaven," "Suliote Women," and "Christ on the Cross." Among his leading

portraits are those of Lamartine, Lafayette, Talleyrand, Madame Guizot, Liszt, and Béranger. His later works consist principally of views from the Bible, including "The Temptation of Christ," "Christ, the Consoler," and "Christ, the Remunerator."

SCHELDT (skělt), a river of Europe, one of the most important of Belgium and the Netherlands. It rises in the French department of Aisne, flows north through Belgium, and enters the North Sea by two arms, known as the Eastern and Western Scheldt. The entire course is 260 miles, of which about 210 miles are navigable. Among the flourishing cities on its banks are Ghent and Antwerp. Numerous canals connect it with other river systems, forming a very important commercial highway. The lower course was entirely monopolized by Holland in 17th and 18th centuries, other nations using it being compelled to pay toll for the passage of vessels. When Holland and Belgium separated, in 1831, these rights passed to the latter country, but in 1863 other powers were given the right to use the river for commercial navigation in consideration of the payment of \$3,750,000.

SCHELLING (shel'ling), Frederick William Joseph, eminent philosopher, born in Leonberg, Germany, Jan. 27, 1775; died Aug. 20, 1854. His father was a pastor of Leonberg, near Stuttgart. He first studied philosophy and theology at Tübingen. Later he pursued a course in mathematics and science at Leipsic and subsequently at Jena, where he became professor of philosophy in 1798. In that position he succeeded Fichte, who had guided his philosophical studies as a teacher. About that time he published "On the Real and Ideal in Nature.' He became professor at Würzburg in 1803, and in 1808 was called to Munich as secretary to the Academy of Arts. There he remained 33 years, 14 of which he occupied the chair of philosophy in the University of Munich, but in 1841 was called to Berlin by Frederick William IV., where he resided most of the succeeding years of his life. His death occurred while at the Bass of Ragaz, Switzerland.

The philosophical speculations of Schelling were influenced largely by Fichte and Hegel, and in the early period partook quite largely of a pantheistic nature. Later his philosophy became more closely associated with that of Spinoza and Brehme, but it may be said to represent a distinct line. His later speculations were based principally on mythology and revelation, which he called positive philosophy to distinguish it from his speculation on identity, called by him negative philosophy. His writings are very numerous and scholarly, and are confined almost exclusively to philosophical research and speculation. Among the most important are "System of Transcendental Idealism," "Soul of the World," "Introduction to the Philosophy of Mythology," "Inquiry into

the Nature of Human Freedom," "Philosophy of Revelation," "Philosophy of Nature," and "Exposition of My System of Philosophy." He edited, in conjunction with Hegel, the Critical Journal of Philosophy, and published a valuable work entitled "Exposition of the True Relation of the Philosophy of Nature to the Amended

Theory of Fichte."

2548

SCHENCK (skěnk), Robert Cumming, soldier, born in Franklin, Ohio, Oct. 4, 1809; died in Washington, D. C., March 23, 1890. His ancestor, Roelof Martense Schenck, came from Holland to New Amsterdam in 1650. After graduating from Miami University, he studied law and entered upon a successful practice at Dayton, Ohio. He was a member of Congress from 1843 to 1851, became United States minister to Brazil in the latter year, and in 1861 entered the United States army as brigadier general of volunteers. In 1861 he commanded at the First Battle of Bull Run. The following year he took part in the Battle of Cross Keys and the Second Battle of Bull Run, receiving a gunshot in the latter that shattered his right arm. He resigned from the army in 1863 and in the same year was reelected to Congress, where he served until 1869. In 1871 he became United States minister to England, but resigned in 1876 to resume the practice of law at Washington, D. C.

SCHENECTADY (ske-něk'tà-dy), a city in New York, county seat of Schenectady County, on the Mohawk River, sixteen miles northwest of Albany. It is on the Erie Canal and the Delaware and Hudson and the New York Central railroads. The site rises gradually from the Mohawk River. The noteworthy buildings include the county courthouse, the public library, the city hall, the Ellis Hospital, the high school, the Y. M. C. A. and the Van Curler Opera House. It is the seat of Union College, which was founded in 1795. Among its manufactures are cotton and woolen goods, flour, machinery, farming implements, cigars, varnish, carriages and wagons, iron bridges, and locomotives. The public utilities include waterworks, sanitary sewerage, and electric street railways. It has a large trade in produce and merchandise. The first settlement on its site was made by Dutch traders in 1662 and a charter was issued in 1684. It was burned by the French and Indians in 1690. In 1798 it was incorporated as a city.

Population, 1905, 58,369; in 1910, 72,826. SCHILLER (shĭl'lēr), Johann Christoph Friedrich von, eminent poet, born at Marbach, Germany, Nov. 10, 1759; died May 9, 1805. He was the son of Kaspar Schiller, an overseer of the nurseries of the Duke of Württemberg. After receiving instruction under private tutors he was taught in a school at Lorch, and in 1773 entered the academy founded by the Duke of Württemberg at his castle, known as The Solitude. There he studied law and medicine, but became greatly interested in literature, especially poetry. His first poem was written in 1772 while still attending the school at Lorch, and ever after poetry remained his chief delight, his principal



FRIEDRICH VON SCHILLER.

interest being in epic and dramatic idealism. He completed the first sketch of "The Robbers" in 1778, which was published in 1780, and two years later was produced on the stage at Mannheim, where it was received with remarkable enthusiasm. Schiller was present at the time without the knowl-

edge of his superiors, which caused his arrest, and finally he left the service of the duke and went to Franconia, where he wrote a number of productions under an assumed name, that of Bauerbach. The writings produced at that time include "Kabale and Liebe." Shortly after he outlined "Don Carlos."

In 1783 Schiller became connected with the theater at Mannheim as dramatist, but two years later proceeded to Leipsic, where he formed an acquaintance with Huber and Kröner. At that time he wrote his "Lied an die Freude" and made a systematic study of Philip II. His "Don Carlos" was published at Dresden, in 1787, and was followed by his "History of the Revolt of the Netherlands." In the same year he visited Weimar, where he met Herder, Wieland, and Goethe, and through the influence of the last named writer secured a professorship of philosophy at Jena. The Duke of Saxe-Weimar granted him a pension, by which he was enabled to provide himself with necessary books of reference, and in 1790 he married Charlotte von Lengefeld. In 1793 he completed his "History of the Thirty Years' War," and once more turned his attention to the production of poems and ballads of the most excellent quality. He lived at Weimar after 1798, where his friendship with Goethe became proverbial, and devoted the remaining years of his life with persevering industry to literary labor.

The most noted dramas of Schiller include "Wallenstein," "William Tell," "Mary Stuart," "The Bride of Messina," and the "Maid of Orleans." Other works of importance not named above embrace "Historical Memoirs from the 12th Century to the Most Recent Times," "Friesco," "Song of the Bell," "Gods of Greece," "Ghost-Seer," "Letters on Esthetic Culture," and "Ideals and Life." Schiller was the recipient of many distinguished honors and was raised to the rank of nobility in 1802. He is by common consent classed among the greatest poetical geniuses of the world, being a tire-

less student and an interesting, earnest, and thoughtful writer. Few authors have been as prolific in producing and none has exceeded him in adding gems of great value to the collective writings of the world. His death resulted largely from overwork, since he continued industriously at his favorite task of writing until the last. He had two sons and two daughters. His widow died in 1826.

SCHILLING, Johann, sculptor, born in Mittweida, Germany, June 23, 1828. He studied at Dresden and Berlin and in 1851 exhibited his first notable work, entitled "Amor and Psyche." The exhibit of this excellent production of art procured him a two years' scholarship at Rome, but in 1856 he settled at Dresden, where he became professor in the academy in 1868. Among the most notable of his productions are the statue of Schiller, at Vienna; the monument of Luther, at Worms; the "War Monument," at Hamburg; and the "National Monument," on the Niederwald. The last named was unveiled in 1883 by Emperor William I.

SCHLEGEL (shlå'gel), August Wilhelm, eminent critic and poet, born in Hanover, Germany, Sept. 8, 1767; died May 12, 1845. After

taking a course in secondary schools, he studied classics and philology at Göttingen, and soon attracted attention as a writer and critic by contributing to various magazines. Later he became lecturer on literature and fine arts at the University of Jena. He was elected to a similar professorship at Berlin in 1802, at Vienna in 1808, and at Bonn



AUGUST W. SCHLEGEL.

in 1818. While at the last named institution he devoted himself largely to the study of Oriental history, made numerous translations from writers of foreign countries into the German language, and lectured on philology and the history of fine arts. He may be classed among the first students of Sanskrit in Germany, and while at Bonn established a Sanskrit printing office and an Indian library. His translations into the German include large parts of the work of Dante, Shakespeare, Cervantes, Camoens, and Calderon. He translated the epic poems of the Sanskrit known as "Rámáyana" and "Mahábhárata," both into the German and Latin. The translation of Shakespeare made by him is still the most classical in the German language. He contributed for several years to Schiller's Horen and in connection with his brother published The Athenaum. Among his other works are "Characters and Critics,"

"Spanish Theaters," "Wreaths of Italian, Spanish, and Portuguese Poetry," and "Poetical Works." He was raised to the noble rank in 1818

SCHLEGEL, Friedrich von, historian and critic, born in Hanover, Germany, March 10, 1772; died in Dresden, Jan. 11, 1829. He was a brother of August Wilhelm Schlegel, studied philology at Göttingen and Leipsic, and entered upon a noted literary career. His first writings were in the form of contributions to journals and periodicals, and in connection with his brother he edited The Athenaum, a magazine devoted to literary criticism. In 1808 he became councilor of the legation for Austria in the Frankfort diet, serving in that position until 1829, and in the meantime wrote the famous proclamations made by Austria against Napoleon. His writings include "Greeks and Romans," "History of the Old and New Literature," "Philosophy of Life," "Philosophy of Language," "Collection of Mediaeval Romantic Poems," "Language and Education of the "Collection of Mediaeval Romantic Hindus," and "Lectures on Modern History." His wife was the daughter of Moses Mendelssohn and assisted him in a number of his writings

SCHLEICHER (shlī'ker), August, philologist, born at Meiningen, Germany, Feb. 19, 1821; died Dec. 6, 1868. After attending the gymnasium of Coburg, he studied at the universities of Leipsic, Tübingen, and Bonn, and in 1850 became professor of comparative philology in Prague. He lectured there until 1857, when he was made professor of languages in the University of Jena. His writings cover a wide range of philological subjects, both in relation to ancient and modern languages, and many of them have been widely translated. Some writers have classed him next to Franz Bopp (1791-1867) as an authority on philology. Among the best known works are "Languages of Europe," "History of Languages," "Hand Book of the Latin Language," "Slavonian Languages as Used in Religious Worship," and 'Comparative Grammar of the Indo-European Tongues."

SCHLEIERMACHER (shlī'ēr-mä-kēr), Friedrich Ernst Daniel, eminent theologian, born in Breslau, Germany, Nov. 21, 1768; died Feb. 12, 1834. He first studied in the schools of the Moravian brotherhood at Niesky, where he received marked religious impressions, and in 1787 entered the University of Halle. In 1794 he became a clergyman at Landsberg, but two years later settled at Berlin, where he assisted Friedrich Schlegel in editing The Athenaum. His first noted work to be published was his "Discourses on Religion," which publication marks an era in that it directed attention to the excessive formalities in religious practice. He became professor of theology and philology at Halle in 1804, but when that university was closed on account of the invasion of the French under Napoleon, in 1806, he returned to Berlin as pastor of the Trinity Church.

He was an important factor in placing the University of Berlin on a stable basis, and in 1810 became a professor in that institution, where he lectured on theology and philosophy. In 1817 he acted as president of the Berlin Synod, and devoted the later part of his life to the completion of a number of extensive works on theology. Among the honors extended to him is an election to the Berlin Academy of Sciences in 1811. His writings include "Christmas Festival," "Concerning the So-called First Epistle of Paul to Timothy," "Christian Faith According to the Fundamental Propositions of the Evangelical Church," "Life of Christ," and "Sermons." Schleiermacher was a man of massive understanding and eloquent oratorical power, and is classed by many writers as taking rank next to Luther as a theologian. His views on theology and philosophy have been commented on by such eminent men as Lücke, Neander, Ullman, Strauss, and Bleek.

SCHLESWIG-HOLSTEIN (shlaz'vĭg hōl'stīn), a province of Prussia, in the most northerly part of the German Empire, except the district about Memel. It is bounded on the north by Denmark, east by the Baltic Sea, Lübeck, and Mecklenburg-Schwerin, south by Hamburg and Hanover, and west by the North Sea. It forms a part of the same peninsula with Jutland. The area is 7,340 square miles.

DESCRIPTION AND INDUSTRIES. The surface is level or gently undulating, and the eastern part is indented by deep and narrow fiords. Much of the interior is moorland, while the western part is marshy and requires dikes to protect it from the sea. It is separated from Hanover by the Elbe, while much of the interior is drained by the Eider. A ridge extends along the eastern coast, hence the drainage is almost entirely into the North Sea. The Kaiser Wilhelm Canal, which connects the Baltic with the North Sea, extends through this province. Agriculture is the principal occupation. The leading products include wheat, barley, oats, sugar beets, rye, live stock, and fruits. Iron and turf are the leading minerals. Large quantities of fish and oysters are taken off the shore. Extensive interests are vested in shipyards, machine shops, textile mills, and sugar refineries. Cattle, horses, and swine are reared in large numbers.

INHABITANTS. The inhabitants are almost exclusively Germanic in descent, but the Frisian, Danish, and Plattdeutsch are spoken in some localities. The public schools and the government use the German language. Almost the entire population is Protestant. In 1900 the province had 1,387,968 inhabitants, of whom 135,000 were Danes. Population, 1910, 1,619,673.

HISTORY. Schleswig constituted a so-called mark in the kingdom of Germany in the 10th century. It was ceded to Denmark in 1027,

when it was conquered by King Canute from Emperor Conrad II. Denmark raised it to the dignity of an hereditary duchy in the 13th century, and in 1375 it passed to the counts of Holstein. When the Holstein dynasty became extinct, in 1460, Schleswig and Holstein were united in choosing Christian I. of Denmark as the ruler, but with the understanding that they should not be separated from each other nor made a part of Denmark. While Holstein was German and Schleswig was Danish, the nobility and the people became Germanized at an early period.

Christian VIII., who became King of Denmark in 1839, pursued a policy of bringing Schleswig-Holstein more firmly into a union with Denmark. In 1848 he was succeeded by Frederick VII., who proclaimed the annexation of Schleswig. This caused a revolution in Schleswig-Holstein, which was occupied by troops from Germany and the Danes were expelled. In 1850 the protection of Germany was withdrawn and a war began the following year, which resulted in a return to the Danish authority. However, Frederick VII. died in 1863 without heirs and was succeeded by Christian of Augustenburg, under whom the constitution of Denmark and Schleswig was ratified.

It was a part of the policy of Bismarck, when promoting the unification of Germany, to incorporate Schleswig-Holstein with the German Empire. In this movement Prussia was aided by Austria and the two powers sent a force to occupy Schleswig. The Danes were defeated by superior numbers and Christian IX. was compelled to accept the Treaty of Vienna, in 1864, which ceded Holstein, Lauenburg, and Schleswig to Austria and Prussia. The two powers agreed by annexing Holstein to Austria and making Schleswig and Lauenburg a part of This agreement finally caused the Seven Weeks' War, in 1866, in which Austria was defeated and Holstein became an integral part of Prussia.

SCHLEY (sli), Winfield Scott, naval officer, born in Frederick County, Maryland, Oct. 9, 1839. After attending the public schools, he



WINFIELD SCOTT SCHLEY.

took a course of instruction in the United States Naval Academy, and subsequent to graduation entered the Civil War as master on the Potomac. His service brought him in connection with many important events, including the west gulf blockading and the

capture of Port Hudson. Shortly after the close of the war he was assigned to the Pacific squad-

ron, and from 1866 to 1869 he was instructor at the United States Naval Academy. In 1884 he commanded the Greely relief ships Bear, Thetis, and Alert, which brought Greely and six others back from Grinnell Land. He was made captain in 1888 and commodore in 1898, and in the latter year took command of the flying squadron at Hampton Roads, which brought him in prominent connection with the blockade of Santiago de Cuba and the destruction of Cervera's fleet on July 3, 1898. Though the American fleet was under the command of William T. Sampson, the signal victory of the Americans is to be attributed largely to Schley, since he commanded in that engagement on account of the absence of the former. For these eminent services he was made rear admiral. He served as a member of the commission to arrange for the evacuation of Porto Rico by the Spaniards in 1898. Subsequently a controversy arose as to the respective merits of the commanders in the Santiago campaign, known as the Schley-Sampson controversy.

This controversy reached its height when Edgar S. Maclay published the "History of the United States Navy," in which he charged Schley with disobedience and cowardice. The Navy Department, at the request of the latter, appointed Admiral Dewey and Rear Admirals Ramsay and Benham to serve as a court of investigation, with Capt. Samuel C. Lemley as judge advocate. The court made a decision on Dec. 12, 1901, but the verdict was not unani-Rear Admirals Ramsay and Benham censured Rear Admiral Schley for his conduct in the Santiago campaign, but exonerated him from cowardice, while Admiral Dewey made a minority report in which he gave him the honor of the victory. His report concludes in these words: "He (Schley) was in absolute command and is entitled to the credit due to such commanding officer for the glorious victory which resulted in the total destruction of the Spanish ships." -He died Oct. 2, 1911.

SCHLIEMANN (shlē'man), Heinrich, eminent archeologist, born at Neu Buckow, Germany, Jan. 6, 1822; died in Naples, Italy, Dec. 27, 1890. He was the son of a Lutheran pastor, who instructed him from his childhood, and at an early age apprenticed him to a tradesman. This brought him in connection with business men of different countries, and he mastered many modern languages of Europe as well as Greek and Latin. He visited Dutch Guiana in 1842. After returning to Europe, he entered a mercantile house at Amsterdam, but subsequently established himself in business at Saint Petersburg, where he gained considerable wealth. In 1862 he came to Sacramento, Cal., and engaged in the banking business until 1866. He went to Asia Minor in 1869 to make excavations on the site of ancient Troy and other notable cities, and in 1874 published "Troy and Its Remains." The Ottoman government required him to pay \$10,-000 for the treasures he discovered, which are

now in the Ethnological Museum at Berlin. He obtained permission from the government of Greece, in 1876, to excavate on the site of Mycenae, which led to the discovery of several royal tombs and rich treasures of gold and silver, now deposited in the Polytechnic at Athens. The interesting results of these explorations were published in his work entitled "Researches and Discoveries at Mycenae." Subsequently he made similar explorations on the island of Ithaca and elsewhere, and published his last two works, entitled "Troja" and "Tiryns."

SCHMALKALDEN (shmäl'käl-den), a town of Germany, in the Prussian province of Hesse-Nassau, 30 miles southwest of Erfurt. It has a considerable local trade, various manufactures, and a population of 7,688. It is a center of interest on account of the League of Schmalkalden, which was drawn up here on April 4, 1531, by nine Protestant princes and eleven imperial cities, to resist aggressive opposition measures promoted by Emperor Charles V. and the Catholic states. Soon after other princes and cities joined the league, and in the time of its greatest strength it included all the Protestant states lying between northern Italy and Skager Rack. It was first intended to continue the league for six years, but in 1535 an extension for ten years was made, at which time a permanent army was raised to defend the religious and political freedom of the Protestants. A Catholic federation was formed in 1538 in opposition to the Protestant league, but the latter was joined by Francis I., King of France, and Henry VIII. of England declared himself its protector, thus giving the Protestants such strength that Emperor Charles V. found himself unable to contend against it. Mutual jealousy crippled the league. When a battle was ventured at Mühlberg on April 24, 1547, the Protestants were defeated and John Frederick and several other leaders were taken prisoners. However, the objects of the league were accomplished through the diplomacy of Duke Maurice, who, as Elector of Saxony, declared war against the emperor and compelled him to grant the Treaty of Passau, on July 31, 1552, by which the Protestants secured religious liberty.

SCHMIDT (shmit), Maximilian, novelist and humorist, born in Eschlkamm, Germany, Feb. 25, 1832. He served in the army of Bavaria during the War of 1850 and during the Franco-German War, and retired in 1872. With the view of devoting his attention entirely to literature, he settled at Munich. A number of his novels have been dramatized and are well known as popular plays. His writings include "Folklore of the Bavarian Forest," "Musician of Tegern Sea," and "My Wanderings of Seventy Years," His writings were published in an edition of 34 volumes in 1893, entitled "Schmidt's

Collected Work."

SCHNITZER (shits'er), Eduard. See Emin Pasha.

SCHNORR VON CAROLSFELD (shnor fon kä'rols-felt), Julius, painter, born at Leipsic, Germany, March 26, 1794; died May 24, 1872. He studied painting under his father, Johann Veit Schnorr (1764-1841), and later in Vienna and Rome. In 1827 he was made professor at the Academy at Munich, where he decorated several noted buildings with frescoes from the Nibelungenlied and encaustic paintings of subjects in the history of Charlemagne and Frederick Barbarossa. He was made director of the picture gallery at Dresden in 1846, and for some time served as professor of art in the academy in that city. His principal productions include "Alms of Saint Roche," "Luther at the Diet of Worms," "The Bible in Pictures," and "The Family of John the Baptist Visiting the Family of Christ.

SCHOFIELD (sko'feld), John McAllister, soldier, born in Chautauqua County, New York, Sept. 29, 1831; died March 4, 1906. After graduating from the West Point Military Academy, in 1853, he became assistant professor of natural philosophy there, serving from 1855 to 1860. He volunteered his services at the beginning of the Civil War and was made major of the first Missouri volunteers. He commanded under Gen. Nathaniel Lyon in the Battle of Wilson's Creek, in which the latter was killed, and in November, 1861, he was made brigadier general, commanding the Missouri militia and the army of the frontier. In 1864 he was given command of the army of the Ohio and accompanied Sherman on his southern campaign, taking part in the capture of Atlanta. Soon after he defeated Hood at Franklin, Tenn., took part in the Battle of Nashville, and in 1865 was sent with his corps to North Carolina, capturing Wilmington and Kingston, and in March joined Sherman at Goldsboro. He drew up the articles for the surrender of General Johnston and from 1866 to 1868 had command of the Virginia military district. In 1868 he succeeded Edwin M. Stanton as Secretary of War, but resigned the following year to become major general of the United States army. He was superintendent of the military academy at West Point from 1876 to 1881, and in 1888 succeeded General Sheridan as general in chief of the United States army with headquarters at Washington. President Cleveland appointed him lieutenant general in February, 1895, but he was retired the following September.

SCHOLASTICISM (skō-lăs'tĭ-sĭz'm), the name of a movement that began with the opening of cloister schools by Charlemagne for the education of the clergy. It was both philosophical and theological in its character and, although confined to no one school, it was distinguished by its teaching of classical logic and philosophy as applied to theology. The philosophers identified with it were known as scholastics, or schoolmen. The exact time of its origin cannot be clearly stated, and there is a vast difference in

the scholastic philosophy of different periods, but the time of medieval scholasticism is generally assigned to the period beginning with 1000 and ending with 1500. It may be said that the scholastics aimed to reduce church doctrines to a scientific system. Their basic assumption was that the church creed is absolutely true, and, when they found a discrepancy between ancient philosophy and ecclesiastical discipline, they accommodated the former to the latter.

Scholasticism had two chief epochs. The first began with John Scotus Erigena in the 9th century and extended to the beginning of the 13th century, in which the Aristotelian logic and Neo-Platonic philosophemes were accommodated to the doctrines of the church. Among the representative names of this epoch are those of Berengarius of Tours, Pope Sylvester II., Anselm, Archbishop of Canterbury, and John of Salisbury. It was a period of contention between the Nominalists and Realists, which terminated in the triumph of the latter, and it therefore became the prevailing mode of thought in philosophy during the golden age of scholasticism, in the 12th and 13th centuries. The second epoch extends from the 13th to the 15th century, ending with the Renaissance and the Reformation. It witnessed the adaptation of the whole Aristotelian philosophy to theology.

Alexander of Haler (died 1245) was perhaps the first scholastic who was acquainted with all the works of Aristotle and the Arabian commentaries on the same, but after his time many others of wide study succeeded in molding thought from the standpoint of a larger view. In this period rose the Scotists and the Thomists, the former being represented by the Franciscans and the latter by the Dominicans, and the quarrels that resulted greatly curbed the influence of scholasticism. It finally laid down the remarkable proposition that a thing might be philosophically true and theologically false, and vice versa. With the revival of letters and the Reformation study began to turn away from the formalities of old philosophies and dead languages as a primary object of investigation, and instead directed its energy to the sciences and human nature. Teachers began to study and observe pupils, to investigate the laws governing physical and spiritual growth, and to proceed according to the newer and better methods.

SCHÖNEBERG (she'ne-berk), a city of Germany, situated immediately south of Berlin, of which it is a suburb. It has electric and steam railway communication with the capital. The noteworthy buildings include the public library, the observatory, an insane asylum, and the buildings of the aërial navigation bureau of the imperial army. It has manufactures of paper, clothing, military supplies, scientific instruments, and photographic apparatus. Schöneberg is noted as a residential center and for its fine gardens and boulevards. Population, 1905, 141,010; in 1910, 172,902.

SCHOOLCRAFT (skool'kraft), Henry Rowe, traveler and author, born in Albany County, New York, March 28, 1793; died Dec. 10, 1864. He studied at Union and Middleburg colleges, and passed many years as Indian agent for the government in the region of the Great Lakes. In 1823 he married the granddaughter of an Ojibway chief, a lady who had been educated in Europe, and made his headquarters at Mackinaw. His connection with the Indians enabled him to learn the languages of a number of different tribes and to study their ethnology and antiquities. He served as a member of the Territorial Legislature of Michigan from 1828 to 1832, within which period he founded the Historical Society of Michigan. He commanded an expedition to the region of the Upper Mississippi in 1832, when he discovered and explored its source

In 1832 the government authorized Schoolcraft to negotiate a treaty with the Indians, which resulted in the purchase of 16,000,000 acres of land in the vicinity of northern Minnesota. He was appointed soon after to act as superintendent of Indian affairs in the Department of the North. Congress authorized him to gather material for an authentic treatise regarding North American Indians, appropriating a large sum of money for that purpose. He published statistics and miscellaneous information of the Six Nations, in 1847, and from time to time added additional volumes, the sixth of the series appearing in 1857. The title of this work is "Historical and Classical Information Respecting the History, Condition, and Prospects of the Indian Tribes of the United States." Other works from his pen include "The Indian in His Wigwam," "Thirty Years with the Indian Tribes of the Northwestern Frontier," "Myth of Hiawatha and Other Legends," "Notes on the Iroquois," "Red Race of America," and "Lectures on the Indian Languages.'

SCHOOLS, the institutions maintained for giving instruction in arts, sciences, languages, or any other branches of learning. Schools in the widest sense include all establishments for systematic instruction of any kind or grade, from the kindergarten to the university, whether of a private or public character. Education in the earliest periods was mainly domestic, being conducted by the parents, and its character was largely religious. Writers generally agree that public schools existed in the time of Babylonia and that they were introduced among the Hebrews shortly after the return from Babylonian captivity. The ancient Greeks maintained public educational institutions for the training of the young, not only in elementary branches, but in industrial arts, sciences, and languages. Schools of a like character were maintained by the Romans. In the Middle Ages educational institutions sprang into existence in many parts of Western Europe, but the schools were for centuries largely in the hands of the ciergy and

comparatively few of the laymen acquired ability to read and write. This condition was favored by the extended discussion of the scholastics in relation to hair-splitting theories of ancient philosophy and ecclesiastical discipline.

This condition continued unchanged until the revival of letters, when thought began to be directed toward the investigation of natural sciences and the organization of schools well calculated to train the child from infancy, according to recognized and salutary methods of instruction. In this period two great classes formed, the one holding that it is the duty of the state to supervise the education of the child from its first attendance at school until at least the elementary branches are mastered successfully, the other promoting the view that instruction should be under the guidance of the church. However, both classes became impressed with the need of making instruction more nearly fitted for the wholesome and progressive development of youth, being in this respect influenced by the eminent teachers of Western Europe, including Pestalozzi, Froebel, Herbart, Rousseau, Rosenkranz, Ratich, Richter, Schlegel, and many others. Instead of making instruction conform to the dead formalities of ancient philosophies, these teachers directed attention to the laws of mind growth and development, and brought the child and teacher in contact with the living and vitalizing influences of nature and first prin-

PRIVATE OR PUBLIC INSTRUCTION. The two parties advocating private and public education are still represented in large numbers, both in America and Europe. The term private education implies the instruction given by tutors or in schools other than those supported by the state, including the schools maintained by various religious denominations, societies, and numerous These schools in some other organizations. places have come in conflict with public schools, since the withdrawal of a part of the children from the latter has decreased their enrollment. Again, they have obliged those patronizing private schools to pay double support-taxes to the public schools and voluntary appropriations to the private. In some countries private schools receive partial support from the government, as in Ontario and Quebec, but in the United States no such aid is given, and all the parochial and other private schools are maintained voluntarily.

The advocates of private schools maintain them for two principal reasons, one being that religious instruction of a definite character is excluded from the public schools, and the other that private schools offer to the parent the particular branches of study and forms of instruction that are wanted for the child. On the other hand, those who advocate education in public schools are of the general opinion that the child should be trained with a special view of fitting him for citizenship, and, to accomplish this to the best purpose, they think it necessary that the

state should prescribe a course of study and require attendance until at least the elementary branches have been completed successfully. While all advocate the highest form of moral instruction, they regard it possible to give a sufficient amount of religious or sectarian training in Sunday schools and churches and during the period of vacation.

Systems of Schools. It is generally admitted that the first public and free school in America was founded by the Dutch in New York, but others were established soon after, the earliest in Massachusetts dating from 1635. The remark made by Governor Berkeley, in 1670, that he thanked God that there were no free schools in Virginia, is often quoted as an evidence that a free and intelligent people are not easily suppressed by tyrants. The public schools of the United States and Canada are not organized on a national basis, but they are under the direct control and supervision of the states and provinces. In this respect they are like those of Germany. Both governments have given aid to the establishment and maintenance of many institutions of learning by the reservation of public lands and by making appropriations for special purposes. The total amount of land appropriated in the United States is 78,889,839 acres. Of this land granted for educational purposes, 67,-892,919 acres were appropriated to aid common schools; 9,600,000 acres, to aid mechanical and agricultural schools; and 1,395,920 acres, to support universities. A national commissioner of education is maintained to conduct the Bureau of Education, whose object is to gather statistics of general interest and to give aid by publishing and otherwise disseminating educational intelligence.

It may be said that there are as many educational systems as there are states and provinces, but they are similar in many respects. In most instances the schools are under a superintendent or minister of education, or an officer having similar executive duties. He is aided in the work of superintendence by county superintendents or similar officers, who have general supervision of the common schools in their respective counties. City superintendents are in most cases appointed by boards of directors in the larger cities and principals are similarly chosen in the towns. In some cases supervisory officers have charge of the schools in the townships. Revenues to maintain the schools are derived from various sources, of which the principal ones are state or provincial school taxes, local taxes, and permanent school endowments. All these are utilized in most instances, but in addition there are other sources of revenue, such as license taxes, fines, and penalties, and in some states poll taxes.

The common schools give instruction in the common branches of education, corresponding to the elementary schools of England and the *Volks-schulen* of Germany. In some states com-

mon schools are the only educational advantages provided in rural districts, but others have township or county high schools. Towns and cities have both elementary and high schools, and in many of the larger cities kindergarten and special schools of various kinds are maintained. In others the same results are obtained by the employment of special teachers in the public and private schools.

Universities and colleges are maintained by all the states, the revenues being secured under state taxation. Normal schools for the professional training of teachers are supported by state taxation, and in most cases a small contingent fee is charged those who attend. Some states maintain a number of normal schools, while others have only one, but in such cases provisions are made for normal instruction to be given in various high schools. Teachers' institutes are inspirational schools with a short course of study. They are designed to inspire educationally and professionally the teachers already in the work and those intending to become teachers. Practically all the states have ample provision for the training of incorrigible children and for the care of the criminal, defective, and dependent classes. Manual training schools and other institutions with special courses are maintained in some states. Laws requiring attendance for a limited period have been enacted in most cases, as in Illinois and Massachusetts, and the period for school attendance is generally fixed by law from the age of six to fourteen years. The prohibition of child labor in mines and factories has greatly facilitated educational advancement, and friends of education generally look upon this as wholesome for both private and public schools. The lowest per cent. of illiteracy in the United States is in the states of the central west. This corresponds somewhat to the condition in Canada, where the lowest per cent. of illiteracy is in the south central provinces. See Education.

SCHOOLS OF CORRESPONDENCE, a class of educational institutions which teach and examine their students by correspondence. This system had its beginning in Germany in 1856, being originated as a means to furnish instruction to those who are unable to attend institutions of higher learning, such as academies and universities. At first the instruction was limited largely to training in certain industrial arts, especially in surveying and architecture. From this beginning a large number of greatly diversified courses originated. These courses now cover practically the entire field of learning.

The general plan of conducting schools of correspondence requires enrollment for instruction for a definite time, usually not less than three months, but the greater number of courses cover a line of work for four years. Students receive their lessons by mail or express, doing the work at home, and examinations required at the end of a term are under the direct super-

vision of some responsible person appointed for that purpose, usually a local justice of the peace or a teacher or principal of schools. The matter of conducting such an examination is merely supervisory, since the questions are furnished by the school or university with which the school of correspondence is associated, and the written examinations are returned and graded by examiners in the home school or office. The University of Chicago developed a scheme for conducting instruction by correspondence, offering courses in about thirty departments, but students who expect to receive a degree are required to take two-thirds of the work by attendance upon the institution. The International Correspondence School at Scranton, Pa., is one of the largest of the kind in the world. Institutions of this kind are now maintained by many colleges and universities, while others are organized by corporations which conduct the work entirely by correspondence.

The lessons were originally sent out in circular form, but now they are more generally published in a series of books. These books or volumes are sent to the student from time to time as he progresses in his study, or he may purchase the entire course and have it delivered to him at the beginning, but the rules require that each student proceed in regular order and that the promotions are based upon examinations at the end of each quarter. In this scheme the personal contact between the teacher and student is replaced with notes and queries sent by mail from time to time. Although all schools of correspondence grant degrees at the completion of the courses, personal attendance is required for at least a part of the time in the larger number of institutions. The phonograph has become an important factor in teaching modern languages by correspondence, making it possible that the instruction and the examination be dependent in a large measure upon the articulation and pronunciation as expressed by both the instructor and the learner.

SCHOONER (skōōn'ēr), a sailing vessel with two or three masts. Vessels of this class are built for fast sailing and are provided with

fore-and-aft sails. Many kinds of schooners are employed, but the two chief classes are those known as fore-and-aft rigged and the topsailschooner. The former are provided with



SCHOONER.

fore-and-aft sails on two masts, and vessels of the latter class carry a square topsail and topgallant sail. Schooners provided with three masts carry fore-and-aft sails on each mast.

SCHOPENHAUER (shō'pěn-hou-ēr),

Arthur, eminent philosopher, born in Dantzic, Germany, Feb. 22, 1788; died Sept. 21, 1860. He was a son of Johanna Schopenhauer (1770-1838), an authoress. After securing a secondary education in his native city, he was trained under the direction of his father for a business career. However, he became interested in literature and entered the University of Göttingen, but later studied at the universities of Berlin and Jena, graduating from the latter in 1813. His university study brought him in contact with the lectures of Fichte and Schleiermacher, who induced in him a love of philosophy. At the time of his graduation he presented an essay that contains the basis of his system, entitled "The Fourfold Root of the Principle of Sufficient Reason." He lived with his mother at Weimar from 1814 to 1818, where he enjoyed the society of Goethe and other men of high culture. Shortly after he settled at Dresden and published a work entitled "Sight and Color." In the same vear he made a visit to Rome and Naples, and spent his time in Italy from 1822 to 1825. In 1831 he settled at Frankfort-on-the-Main, where he devoted himself to literary research and the development of his system of philosophy.

The fundamental doctrine of Schopenhauer is that will is the only essential reality in the universe. According to it, the phenomena we call appearances exist only in subjective representations and constitute mere forms under which will is shown. He asserts that will is not necessarily accompanied by self-consciousness, but it strives to attain that end. In this he opposes the doctrines announced by Fichte, Hegel, and Schelling, who regard consciousness as a necessary basis of thought. Schopenhauer advocated a form of ethics based on a thorough pessimistic theory of existence, its ideal being the negation of the will to live. He led a solitary life, had few intimate friends, and through an apparently natural disposition to despise women he never married. In several of his writings he made attacks upon a number of philosophers who differed from him, but his works attracted little attention until many years after his death. At present his views have a wide influence on philosophical speculation. His writings embrace "The World Considered as Will and Idea," "Freedom of the Will," "Will in Nature," "Fundamentals of Morality," and "The Two Basic Problems of Ethics."

SCHOULER (skōō'lēr), James, historian, born at Arlington, Mass., March 20, 1839. He studied at Harvard University, where he graduated in 1859, and took up the practice of law in Boston. In 1862 he joined the Federal army for service in the Civil War, but resumed his practice the following year. He was made a lecturer in Boston University in 1884, and subsequently held like positions at the National Law School in Washington and at the Johns Hopkins University. His most important work is entitled "History of the United States Under the

Constitution," which embraces the history of the nation subsequent to the colonial period. Other publications include "The Law of Personal Property," "Constitutional Studies," "The Law of Wills," "The Law of Husband and Wife," "The Law of Domestic Relations," and "Life of Thomas Jefferson."

SCHUBERT (shoo'bert), Franz Peter, eminent German musical composer, born in Vienna, Austria, Jan. 31, 1797; died Nov. 19, 1828. His father was a schoolmaster in Leopoldstadt and began to give him instruction in music at the age of seven years. His voice attained such culture and beauty that it attracted sufficient attention to admit him into the choir of the imperial chapel in 1808. The succeeding five years he studied the violin and received training in singing at a school called the Convict, but a temporary failure of his voice caused him to leave that institution in 1813. Subsequently he was taught for three years in the school of his father. He soon turned his talent to profitable use by teaching music and composing. Schubert was early skilled on the piano and many other musical instruments, and by 1815 composed five operas, two symphonies, and 137 songs. In the meantime his father became teacher at Lichtenthal, where he attended until reaching the age of eighteen years.

In 1819 the musical friends of Schubert secured the presentation of his song "The Shepherd's Lament" at a concert in Vienna, as well as his comic operetta "The Twins," thereby bringing his productions to public notice. From that time he was aided financially by a large sale of his productions. In 1825 he made a tour of Austria and Germany, meeting everywhere with enthusiastic receptions. Schubert was not only an able and tireless writer of music, but produced compositions with such rapidity that he astonished even his friends. It appeared that he could not refrain from writing when his genius became inspired with an idea. His entire compositions include six masses, ten symphonies, fifteen operas, and 600 songs. His "Seventh Symphony" is regarded the most beautiful and ranks with those of Beethoven. Other productions that would alone entitle him to high repute include "Hark, Hark, the Lark," "Rosamond," "Enchanted Harp," and "Fierabras." The principal collections of his songs include "Müllerlieder," "Winterreise," and "Schwanengesang." His death at the early age of 32 years was brought on by excessive work, terminating in a sudden

SCHUMANN (shōo'mān), Robert, musical critic and composer, born in Zwickau, Germany, June 8, 1810; died near Bonn, July 29, 1856. He first studied law at the University of Heidelberg, but his ambition to excel as a pianist induced him to devote himself to music. After studying for some time, he sustained a permanent disablement of one of his fingers whereby he was com-

delirium on Oct. 13, from which he never recov-

pelled to devote himself exclusively to the composition of music. In 1840 he married Clara Wieck (1819-1896), daughter of Friedrich Wieck, one of the most eminent pianists of that period. He established The New Magazine of Music in 1834, with which he was connected ten years, and made it an important influence in developing musical art and bringing his productions to public notice. Few composers labored with greater devotion to add substantially to the finer musical productions, many of his compositions being of the highest class, notably the cantata "Paradise and the Peri," and his greatest orchestral work, entitled "Symphony in B."

Mendelssohn had located in Leipsic in 1835, where he and Schumann lived upon the warmest terms of friendship. Their numerous productions made that city the musical center of Germany. Schumann was made professor of composition in the conservatory of music founded at Leipsic by Mendelssohn in 1843, and in 1850 became musical director at Düsseldorf, a position he retained till 1853. His mind became clouded in the latter year, and he was soon after confined to a hospital near Bonn, where his death occurred. The musical compositions of Schumann include a number of symphonies, cantatas, concertos, and orchestral works. He contributed largely to the literature of art, being the author of a number of valuable essays and criticisms. Among his works not named above are "Scenes of Childhood," "Kriesleriana," "Carnival," "Papillons," "Etudes Symphoniques Fantasias," "Overture Scherzo," "Genevieve," "Finale," and "Manfred." His wife made his music highly popular in Europe by playing with marked success in many of the leading cities, and before her death he attained a rank among the greatest composers. He was one of the leading representatives of the Romantic school.

SCHUMANN-HEINK, Ernestine, contralto singer, born at Lieben, near Prague, Bohemia, in 1861. She descended from a German family by the name of Roessler, studied music at Gratz, and made her début at Dresden in 1878. In that city she sang with marked success a period of four years, and in 1883 became connected with the Stadttheater at Hamburg. In the same year she married Heink and ten years later became the wife of Paul Schumann. She sang with much success in the leading cities of Canada and the United States, where she toured in 1898, and several times afterward. Her leading rôles were Azucena in "Il Trovatore" and the First Norm in "The Ring of the Nibelungen."

SCHURMAN (shoor'man), Jacob Gould, educator, born at Freetown, Prince Edward Island, May 22, 1854. He studied at the Acadia College, Nova Scotia, and at the University of London, and was granted a degree by the latter in 1877. Subsequently he studied at the German universities of Berlin, Heidelberg, and Göttingen, and in 1880 was made professor of English literature at Acadia College. In 1882 he became pro-

fessor of English literature and philosophy at Dalhousie College, serving until 1886, when he was made professor of philosophy at Cornell University. In 1892 he succeeded Charles Kendall Adams as president of Cornell University, and in 1899 became chairman of the first educational commission in the Philippine Islands. His influence as a teacher and writer on educational topics is extensive. Among his publications are "Ethical Import of Darwinism," "Agnosticism and Religion," "Kantian Ethics and the Ethics of Evolution," "Belief in God," and "Philippine Affairs."

SCHURZ (shoorts), Carl, statesman and journalist, born in Liblar, Germany, March 2, 1829; died May 14, 1906. He studied at Bonn

until 1848 and the following year took part in the Revolution. After engaging in the unsuccessful defense of Rastadt, a fortified town of Baden, he was compelled to flee to Switzerland. He removed to the United States in 1852, residing first at Philadelphia, but later settled in Watertown, Wis. He established a successful law practice



CARL SCHURZ.

at Milwaukee in 1859, where he became prominent as a leader among the Germans, and was closely identified with the organization of the Republican party. In 1860 he gave active support to Lincoln, who appointed him United States minister to Spain in 1861, but he soon after resigned to enter the army. He was made brigadier general of volunteers in 1862, and the following year became major general, commanding in the Second Battle of Bull Run, Chancellorsville, Gettysburg, and Chattanooga.

Schurz settled in Saint Louis soon after the war, where he edited the Westliche Post and in 1869 was made United States Senator. In 1872 he supported Horace Greeley for President, removed to New York in 1875, and in 1876 made an active canvass for Rutherford B. Hayes, who selected him as Secretary of the Interior. He edited the New York Evening Post from 1881 to 1883, and the following year actively supported President Cleveland on the issue of civil service reform. In 1896 he made an active campaign for President McKinley on the issue of a single gold standard, and in 1900 supported W. J. Bryan on account of his opposition to the war policy of the Republican party. Schurz ranks as one of the most influential speakers and writers of the United States. He is noted particularly for his independence in political discussions. He wrote one of the best biographies published of Henry Clay. His noted speeches include "Abolition of Slavery as a War Measure," "Irrepressible Conflict," and "Eulogy on Charles Sumner."

SCHUYLER (skī'lēr), Philip, soldier, born in Albany, N. Y., Nov. 22, 1733; died there Nov. 18, 1804. His father left to him a large estate, much of which he turned to good account in aiding the American colonies. From 1755 to 1758 he served in the British army against the French, and was promoted to the rank of major. He sat as a delegate in the Continental Congress at Philadelphia in 1775, and was made one of the four major generals first appointed to serve in the Revolutionary army. Immediately he proceeded to Ticonderoga with the design of invading Canada, but poor health obliged him to return to Albany and give up his command to General Montgomery, and there discharged the duties of commissary general. After serving as a representative in Congress, in 1777, he became chief of military in Pennsylvania, and subsequently was given command of the Northern department. He was present when Burgoyne surrendered at Saratoga, assisting General Gates in making necessary arrangements, but in 1779 resigned his command and served as a member of Congress. Schuyler was not only a trusted friend and adviser of Washington, but aided the public treasury by making advances from his private resources. He was elected United States Senator from New York in 1789 and again in 1797. As a member of the New York Legislature he contributed largely to the code of laws, and aided in promoting the canal system in the State. His influence in politics was with the Federal party

SCHUYLKILL (skool'kĭl), a river in Pennsylvania, the largest tributary of the Delaware. It rises in Schuylkill County, near Pottsville, and, after a course of 130 miles toward the southeast, enters the Delaware at Philadelphia. The Schuylkill flows through a rich mining and agricultural country, supplies excellent water power, and is one of the most beautiful features of Fairmount Park, Philadelphia. It furnishes that city its water supply and is navigated by canal boats, by means of dams and locks, to the coal region in Schuylkill County. Among the thriving cities on its banks are Philadelphia, Phoenixville, Reading, Norristown, and Pottsville.

SCHWANTHALER (shvän'tä-ler), Ludwig Michael, sculptor, born at Munich, Germany, Aug. 26, 1802; died Nov. 2, 1848. He studied sculptoring under his father and at the Academy of Munich, where he was made professor in 1835. For some time he studied and worked in Rome, where he executed many noted works of art. His monuments include those of Goethe at Frankfort, the one of Mozart at Salzburg, and the one to Jean Paul at Bayreuth. Among his statues are those of Louis of Hesse at Darmstadt, of Charles Frederick of Baden at Karlsruhe, and of Frederick Alexander of Brandenburg at Erlangen. He executed 15 figures of the Battle of Arminius, in the pediment of the Walhalla at Regensburg; 24 statues of painters. in the New Pinakothek; and the colossal bronze statue of Bayaria, 65 feet high, in Munich.

SCHWATKA (shwot'ka), Frederick, Arctic explorer, born in Galena, III., Sept. 29, 1849; died in Portland, Ore., Nov. 2, 1892. He graduated from the West Point Military Academy in 1871 and until 1877 served as lieutenant of cavalry. In the meantime he was admitted to the Nebraska bar and secured a medical degree in New York. He was made commander of an expedition to King William's Land in 1878. His company discovered the remains of Sir John Franklin's party and secured information of value regarding its adventures. After many hardships and a sledge journey of 3,250 miles, the party returned to the United States, in 1880. In 1884 he explored the course of the Yukon in Alaska and had charge of an expedition sent by the New York Times into Alaska in 1886, when he ascended Mount Saint Elias to a height of 7,200 feet. In 1889 he conducted an expedition to study the remains of cliff and cave dwellers and of the Aztecs in Mexico, and in 1891 made another expedition to Alaska. Among the honors bestowed upon him are medals from the Imperial Geographical Society of Russia and the Geographical Society of Paris. He wrote "Nimrod of the North," "Along Alaska's Great River," and "Children of the Cold."

SCHWEINFURTH (shvin'foort), Georg August, German explorer and naturalist, born in Riga, Russia, Dec. 29, 1836. He first studied at Riga, but later at Heidelberg, and conducted scientific excursions to study botany in France, Russia, and Italy. Between 1864 and 1871 he made three tours to Egypt, where he studied the flora and fauna of the Nile basin. He made extended explorations of the oases in the Libyan desert from 1873 to 1875, and in the latter year was appointed by the Khedive of Egypt as director of the Cairo Museum of Natural History. From 1876 to 1878 he made explorations of the region between the Red Sea and the Nile, explored the island of Scotia in 1881, and subsequently promoted German colonization in the equatorial regions of Africa. Many valuable collections of natural history were sent by him to the National Museum of Germany. His writings include "In the Heart of Africa," "Flora of Ft'aiopia," and "Plants and Plant Life."

SCHWERIN (shvå-rēn'), a city of Germany, capital of Mecklenburg-Schwerin, 60 miles east of Hamburg. It is beautifully located on Lake Schwerin, a body of water fourteen miles long and three miles wide. The noteworthy buildings include the Grand Ducal Library, the palace of justice, the public theater, the gymnasium, and many churches. It is the seat of a fine Gothic cathedral founded in 1248, and near it is a ducal castle erected by Wallenstein. In front of the theater is a statue of Rauch. The manufactures include tobacco and cigars, clothing, earthenware, cotton and woolen goods, carriages, and machinery. It is first mentioned in

1018 and became a municipality in **1161**. Population, 1905, 41,628; in 1910, 44,286.

SCIENCE, the sum of universal knowledge. In a more limited sense the term is applied to any department of knowledge gained and verified by exact observation and correct thinking. According to the former definition it resembles philosophy, which deals with the whole sum of knowledge, but as limited by the latter it deals with a particular department of knowledge concerning some subject or group of subjects. In the beginning of study it was necessary to collect and observe facts, then to form them into a system and reduce the generalizations to laws, and finally to proceed to some principle accounting for these laws. It is clearly shown by history that many laws long accepted were overthrown by subsequent investigation, but in the course of time it became possible to demonstrate the truth of certain basic principle; that are now accepted generally. The five divisions of science include mathematics, treating of quantity; physics, treating of matter and its properties; biology, treating of the phenomena of life; anthropology, treating of the phenomena of mankind; and theology, treating of the Deity.

Another classification of the sciences divides them into applied, or practical, sciences, and pure, or theoretic, sciences. The former include those that treat of the knowledge of facts or events accounted for or produced by definite laws, and the latter embrace the knowledge of these laws as considered apart from all application. Pure, or fundamental, sciences include mathematics, psychology, physics, sociology, and chemistry. The applied, or concrete, sciences embrace botany, meteorology, mineralogy, geology, geography, zoölogy, law, ethics, politics, grammar, jurisprudence, rhetoric, logic, philology, engineering, economics, surgery, medicine, and many others. The development of the sciences may be traced through different stages of evolution, the initial periods being found in re-

mote antiquity.

Man's desire to ascertain his proper conduct toward his fellows and his Creator caused moral science, a department of mental science, to be the first to attain some degree of maturity. The next to receive attention was mental science, or the study dealing with the power to think, feel, and will, but slow progress was made in the lat-As a result psychology as a branch of knowledge is in its conclusions still far from certainty. Many myths of the ancients were hypotheses connected with natural phenomena, and in them may be found the beginning of physical sciences. Progress in the physical sciences was slow until the beginning of the 18th century, when they began to develop with remarkable rapidity, and knowledge connected with them surpassed the advances made in astronomy, physics, chemistry, and botany, though all these had received attention long before. Little study was given to geology before the 19th century,

while anthropology, comparative religions, and other allied sciences are materially newer.

No one can be a successful student of science unless he considers truth of prime importance and is willing to sacrifice preconceived notions whenever he discovers new truths to render the formerly accepted views erroneous. penditure of money, time, or even life is not considered useless if the student adds fresh truth, or even paves the way for the addition of valuable discoveries. No limit to the field of discovery can be conceived, although at times mankind was led to believe that human ability to add to knowledge had been exhausted. However, modern discoveries demonstrate conclusively that there are still fields as productive as ever confronting the seeker for scientific extension. This is evidenced by turning to practical account through scientific inquiry such resources as culminated in the application of telegraphy, steam, electricity, and many others of vast importance.

SCILLY (sĭl'lĭ), an island group belonging to the British Isles, situated 28 miles southwest of Land's End, England. The group includes about 35 islands, but only 6 possess any importance, the others being formed largely of rocks. These islands belong to and form a part of Cornwall County. Saint Mary's Island is the largest, having an area of 1,528 acres. The climate is moist and variable, and the principal products are vegetables and spring flowers, which are transported to the London market. Deposits of tin and granite abound and the fisheries are of value. The islands were conquered by Athelstan in 938 and were granted to some monks, who formed settlements on the island of Tresco. Sir Francis Godolphin secured a lease of them from Queen Elizabeth and they remained in possession of his family for 250 years, but are now the property of the crown. Population, 1918, 2,160.

SCIO (sī'o), an island in the Aegean Sea, 7 miles off the coast of Asia Minor, 52 miles west of Smyrna. It is 32 miles long, 17 miles wide, and has an area of 400 square miles. The climate is favorable. Among the chief productions are silk, cotton, wine, mastic, cereals, and many species of fruits. Horses, cattle, swine, and sheep are grown. It has valuable fisheries and manufactures of silk and woolen goods, confectionery, carpets, and clothing. Formerly the island was populated entirely by Greeks, but in 1822 the Sciotes joined the revolution against Turkey, when many were massacred. Scio holds a prominent place in ancient history and contends for the honor of being the birthplace of Homer. Kastro, population 18,975, is the capital. Population of the island, 1918, 71,486.

SCIOTO RIVER (sf-ō'tō), a northern tributary of the Ohio, which rises in Auglaize County, western Ohio, and after a course of 285 miles toward the east and south, flows into the Ohio River at Portsmouth. The Scioto valley is fertile, producing large quantities of cereals, fruits, and live stock. The river is navigable

during high water about 130 miles from the mouth and is of importance in connection with the Ohio and Erie Canal. The chief tributaries

are the Whetstone and Derby.

SCIPIO (sip'i-o), Publius Cornelius, called Africanus Major, eminent Roman soldier, born about 234 B. C.; died 183 B. C. The first mention of him is made in connection with the Battle of the Ticinus in 218 B. C., where he saved the life of his father, Publius Cornelius Scipio, who was the first Roman general to encounter Hannibal in battle. Soon after he was made military tribune, and in 216 B. c. took part in the Battle of Cannae, from which disastrous field he escaped to collect the remains of the Roman army and save the capital. In 212 B. c. he became aedile, though still under age, and in the following year was appointed proconsul of the Roman army in Spain. His successful campaign began with the defeat of the Carthaginians at New Carthage, and the capture of other cities followed in rapid succession. He defeated Hasdrubal, brother of Hannibal, in 209 B. C., and soon after drove the Carthaginian army entirely from Spain.

Scipio was commissioned to carry the war into Africa, but Hannibal was recalled from Italy to meet him in battle at Zama, where he defeated the Carthaginians on Oct. 19, 202 B. C., and thus ended the struggle for Roman supremacy over Carthage. On returning to Rome he was given a magnificent triumph, received the surname of Africanus, and was offered the dictatorship for life, but declined. Soon after he was sent against Antiochus, King of Syria, and when the war against that monarch terminated successfully, in 189 B. C., he retired to private life. Two years later his brother, Lucius, was prosecuted for receiving bribes from Antiochus while in Syria, and later Scipio was charged with being implicated, but the senate ended the prosecution on the anniversary of the great Battle of Zama. Scipio was considered the ablest general of Rome before the time of Julius Caesar, and is described as a man of remarkable bravery, courtesy, and pious faith in the gods. Cornelia, his daughter, was the mother of the Gracchi. His death occurred at Campania, his country home, it is believed the same year in which his great opponent, Hannibal, died.

SCIPIO, Publius Cornelius, called Africanus Minor, Roman soldier, born in 185 B. C.; died in 129 B.C. He was the son of the great conqueror of Macedon, Lucius Aemilius Paulus, and became adopted by Publius Scipio, son of Scipio Africanus Major. He was with his father at the decisive battle of Pydna, in Macedon, in 168 B. C., and while in Greece formed a lasting friendship with Polybius, the historian. In 151 B. c. he was sent as military tribune to Spain and at the beginning of the third Punic War, in 149 B. C., led a Roman army to Africa, where he began the siege of Carthage. The senate made him consul in 147 B. C., though not of legal age, and he thus became the leader of the army

against the Carthaginians, in which capacity he stormed Carthage the following year. The ruin and completed destruction of that city were regretted sincerely by him.

It is said that as Scipio beheld the destruction wrought by the army in Carthage, he thought of the future fate of Rome, uttering at the same time the words of the "Iliad":

"The day shall come when sacred Troy shall perish, And Priam and his people shall be slain.'

On returning to Rome, he was honored with a triumph, and was surnamed Africanus. He became censor in 142 B. C., ambassador to Egypt and Asia in 139 B. C., and was reëlected consul in 134 B. C. In the latter year he was sent to Spain, where he conquered Numantia after a siege of eight months, and destroyed and sacked the city. His political life at home was not highly successful, since he created much opposition by opposing the agrarian law of Tiberius Gracchus and generally sympathized with the leaders of the aristocratic party. It is thought that his death resulted from violence by instigation of leaders opposed to him politically, for the reason that he was found dead in his bed.

SCISSORSBILL, or Skimmer. See Skim-

SCONE (skoon), a town of Scotland, on the Tay River, two miles north of Perth. It is celebrated for its monastery, first mentioned in the early part of the 10th century, in which the kings of Scotland from 1153 until 1458 were crowned. It contained the famous Stone of Destiny on which the kings of Scotland were inaugurated, which was taken to Westminster Abbey by Edward I. in 1296.

SCORESBY (skorz'bi), William, explorer, born near Whitby, England, Oct. 5, 1789; died March 21, 1857. He was the son of a whaler and accompanied his father to Greenland during the summer, but studied at the University of Edinburgh in winter. In 1876 he was the chief officer of the ship Resolution, with which he sailed to 81° 30' north latitude, the most northerly point reached up to that time. He explored the eastern coast of Greenland in 1821, and the following year surveyed and chartered about 806 miles of the winding coasts. In 1856 he made a voyage to Australia for the purpose of studying terrestrial magnetism in that continent. He published "Journal of a Voyage," "History and Description of the Arctic Regions," and "Journal of a Voyage to Australia for Magnetic Research.'

SCORPIO (skôr'pĭ-ô), or Scorpius, the eighth sign of the zodiac. This constellation is now situated in the sign Sagittarius, owing to the precession of the equinoxes. It contains Antres, a bright red star, and on each side of it

is a smaller star. See Zodiac.

SCORPION (skôr'pĭ-ŭn), the name of an extensive genus of insects, native to the warm climates of both hemispheres, belonging to the same family as the spiders. The body is elongated, usually from two to six inches, and somewhat resembles that of small lobsters in shape. They have a long, narrow, flexible tail, which is capable of being curved over the back and terminates in a poisonous sting. Six broad segments are found in the abdomen and six narrow ones in the tail. The sting consists of a curved and sharp modification of the last segment. They are provided with six, eight, or twelve eyes, and have eight legs and two large claws resembling those of the lobster. The scorpions frequent dark places during the day, usually seeking shelter under stones, but at night come out in search of food. It is not uncommon to find them in hiding under pillows, boots, and other objects in warm climates, where they are disliked and dreaded. Their sting, though painful and poisonous, is not usually, if ever, fatal to man.

Scorpions are found in abundance in Southern Asia and Europe, Northern Africa, Australia, and the tropical parts of America. The black



SCORPION.

scorpion has a body about six inches long. Its sting is very poisonous. Several small species are native to the southern part of the United States. The so-called rock scorpion is a familiar kind. Another group of insects allied to them is the book scorpions, but they are smaller and do not possess the jointed tail common to the true scorpions. They live in or among books, where they subsist on minute insects that frequent such places. The true scorpions feed on spiders and insects. From thirty to sixty young are brought forth from eggs at a time and are carried on the back of the mother during early life.

SCORPION FISH, the name of several species of fishes of the gurnard family. The common scorpion fish of the Pacific coast, found off the shores of California and Mexico, is sold extensively on the market. It is a foot in length and has a brownish color, tinted with rosy and olive shades. Several species are found in the Mediterranean and off the Atlantic coast of Southern Europe, including the red and the spotted scorpion fishes.

SCORPION FLY, the name of several insects related to the dragon flies, so called from the terminal segments of the abdomen being mobile and elongated. The outer segments are curved over the back similar to the tail in the

true scorpion, and in some species a pair of forceps are attached to the last joint. When excited and irritated, the forceps are used as offensive and defensive weapons. These insects have four wings, through which many veins permeate, and the head is prolonged in the form of a beak. The larvae feed upon insects and dead animals, while the adults subsist largely on juices of plants. Many species are common to Canada and the United States, including some wingless forms.

SCOTCH TERRIER. See Terrier.

SCOTLAND (sköt'land), a political division of the United Kingdom of Great Britain and Ireland. It is situated north of England, from which it is separated by the Cheviot Hills, the Tweed River, and the Solway Firth. All the remainder of the boundary is formed by the Atlantic Ocean, which extends into its shores by numerous indentations of such extent that practically all parts are within forty miles of the sea. The length from north to south is 285 miles and the width varies from 25 to 145 miles. Including the adjacent islands, it has an area of 39,785 square miles.

DESCRIPTION. Scotland is remarkable for its extensive coast indentations, which give a coast line of about 2,500 miles. The most important indentations include the Firth of Forth, the Firth of Tay, Moray Firth, and Dornoch Firth on the east, and the Firth of Lorne, the Firth of Clyde, and Solway Firth on the west. Between Scotland and Irelands extends the North Channel. About 800 islands are adjacent to its shores, of which the Orkney and the Hebrides are the largest groups. Along the western coast are numerous small islands, of which the principal ones are Arran, Bute, and the Cumbraes. The islands stretching along the coast from Islay to Skye are known as the Inner Hebrides, and these are separated from the Outer Hebrides by the straits of Minch and Little Minch.

Three natural divisions characterize the surface, including the southern uplands, the central lowlands, and the highlands of the north. The Grampian Hills form the larger part of the highlands and are located north of the Caledonian Canal, which connects the Firth of Lorne with Moray Firth. They include summits that rise somewhat more than 4,000 feet above sea level, of which Ben Nevis, the highest mountain in Great Britain, rises 4,406 feet. South of the Grampians are the central lowlands, which stretch from the Firth of Clyde to the Firth of Tay, and include many beautiful lakes and streams, connected largely by important canals, among them the Caledonian Canal from the west to the east. The southern uplands are formed largely by the Cheviot Hills, from which ranges stretch toward the north, culminating in peaks about 3,000 feet above sea level. Within this section are many fertile valleys, but the largest cultivated region of Scotland is in the plain of Strathmore, in the central part.

Most of the streams are valuable for the production of salmon and other fish, and the lower courses of many are important for their navigation facilities. The rivers flow chiefly toward the east into the North Sea. These include the Tweed, on the southern border, the Tay, the Forth, the Don, the Dee, the Spey, and the Findhorn. Among the rivers flowing toward the west are the Clyde, the Doon, the Nith, the Esk, and the Annan. Many beautiful lakes are found in various sections of the country, but especially in the mountains. Of these, Loch Lomond, area 28 square miles, is the most important. Other fine sheets of water include Doon, Dee, and Saint Mary's lakes, in the southern uplands; Leven Lake, in the central lowlands; and Tay, Earn, Awe, Rannoch, Shiel, Katrine, and Maree lakes, in the highlands of the west and north.

The climate of Scotland resembles that of England, but it is somewhat colder, owing to its location farther north and to its surface being somewhat higher. It is influenced by the warm waters of the Gulf Stream, which wash its western shore, but this is partly overcome by masses of floating ice from the Arctic Ocean. The thermometer rarely falls to zero in winter and the summer heat is seldom above 80°. Rainfall is heavier on the west coast than on the east, varying between 40 and 80 inches along the former and between 20 and 30 inches along the latter. In the western highlands the rainfall is excessive, reaching 130 inches. Snow lies on the ground for two or three months in the hills.

MINING. The country is rich in coal and iron and the output of both minerals is large. Coal is found in large deposits in the southern part, especially in Lanarkshire. Iron is mined in Ayrshire and Sterlingshire and lead is produced in Lanarkshire and Dumfriesshire The lowlands have deposits of mineral oil. Granite, slate, and limestone are quarried in large quantities for commercial purposes. Valuable clays are widely distributed.

FISHING. The fisheries yield large quantities of herring, haddock, cod, and salmon. Scotland has held high rank in the output of herring for centuries, the product being largely cured or canned for the markets in Great Britain. Dundee and Peterhead are headquarters for whaling fleets for the Arctic and Antarctic regions. Aberdeen is the most important fishing center of the eastern coast. The total output of the fisheries has an annual value of \$2,500,000.

AGRICULTURE. The cultivation of the soil is not profitable in many parts of the country, owing to its rugged and barren surface. Farming is confined largely to valleys and the low-lands, which are highly fertile and are cultivated with great care. Oats are grown on the largest parts of the cultivated area. Other cereals include barley, wheat, and rye. Turnips are grown extensively as stock food, and potatoes are everywhere an important crop. Grasses of all kinds yield well, especially clover, which is

grown extensively for hay and as a means of maintaining fertility. The highlands are utilized for grazing, especially in raising the Cheviot grade of sheep, which are native to Scotland. Many breeds of cattle are celebrated and have been naturalized in other countries, such as the Jersey, Ayrshire, Galloway, and Polled Angus. Shetland ponies and Clydesdale horses, two celebrated breeds, are grown extensively. Other domestic animals include swine and poultry.

Manufactures About one-fourth of the people are engaged in manufacturing enterprises. These industries of Scotland have kept pace with those of England, both in quality and quantity. Cotton, linen, and woolen textiles comprise the most important manufactures. Glasgow is noted as a center of the iron and steel industries, especially in producing hardware and machinery, and extensive shipyards are located along the Clyde. Scotland has large interests in distilling and is unrivaled in the output of whisky of a high grade. Large publishing and printing establishments are maintained in Edinburgh and chemicals are manufactured in large quantities in Glasgow. Other products include glass, confectionery, pottery, boots and shoes, lace, silks, worsted goods, and machinery.

COMMERCE AND TRANSPORTATION. The trade of Scotland is closely identified with that of Great Britain and it carries a large share of the coastwise and foreign trade. Improvements on the Clyde River have made it possible for ocean vessels to reach Glasgow, which is the principal port of Scotland. A large volume of local traffic is carried through the Caledonian Canal, which is not sufficiently large for seagoing ships of modern manufacture Railways have taken the place of many canals formerly maintained in the lowlands, but these are still of importance in handling a share of local traffic. At present the railways have a total of 3,750 miles, but the lines are confined chiefly to the region south of the Caledonian Canal, and the larger systems have direct connection with those of England and Wales. The highways are in a good condition, many being improved by a superior grade of macadam.

GOVERNMENT. Scotland forms an integral part of the United Kingdom and is represented in both branches of the British Parliament, having 72 members in the House of Commons and 16 representative peers to the House of Lords. At the time of the union, in 1707, the judicial system and the Church of Scotland were left intact. Two high courts are maintained, a court of session for civil cases and a judiciary for criminal offenses. For local government it is divided into 18 counties, presided over by county councils, and cities and burghs are governed by municipal bodies. In educational matters it has long been in advance of England and education is free in the borough schools, which are managed by local authorities. Four excellent universities are maintained, situated at Aberdeen, Edinburgh, Glasgow, and Saint Andrews. These institutions receive aid from the government and are open to women and men under the same condition.

INHABITANTS. About one-tenth of the people are foreigners, consisting chiefly of English and Irish. Practically the entire mass of the Scotch people belong to the Presbyterian denomination, known here as the United Free Church of Scotland. A number of the inhabitants are Episcopalians and Roman Catholics, but the former are constituted mainly of English and the latter of Irish elements. The density of population is 150 to the square mile. Edinburgh, which has its seaport at Leith, is the capital. Glasgow, on the Clyde, is the largest commercial center. Other cities include Dundee, Aberdeen, Paisley, Kilmarnock, and Perth. In 1901 Scotland had a population of 4,472,103; in 1911, 4,759,521.

Language and Literature. The Gaelic or

Celtic tongue was spoken in northern and western Scotland down to the 15th century, but English was in general use in the lowlands toward the center and east. Peculiar characteristics prevail that still mark with local dialects the language spoken in different parts of the country, but there has been a constant tendency to make the language conform to the form spoken in northern England. The literature of Scotland may be said to date from 690, when Adamnan, abbot of Ionia, wrote the life of his predecessor in the Latin. This was followed by other productions in the native dialect, but there were few writings of note until in the latter part of the 14th century, when Barbour wrote his famous work entitled "Bruce." Wyntoun's "Oryginale Cronykil of Scotland" appeared about 1422, and about the same time James I. wrote a number of poems, among them "King's Quhair." William Dunbar, Gawyn Douglas, and Sir David Lyndsay produced several works of high literary value in the latter part of the 15th century. A work on religion by John Hamilton, Archbishop of Saint Andrews, was published in 1552 under the title "Catechism, that is to say ane Commone and Catholike Instruction of the Christian People in Materis of our Catholike Faith and Religioun." In 1560 Sir Richard Maitland published a collection of satirical poems and Alexander Scott soon after wrote a number of domestic poems, among them "Jousting Betwixt Adamson and Sym." Other writers of this period include Alex. Montgomery, Sir William Alexander, and John Rolland.

Scottish literature was greatly influenced by the Reformation. Among the leading writers of that period are John Knox, James VI., and Sir David Lyndsay. The last named is noted particularly for his collection of songs published in 1597, entitled "Ane Compendious Booke of Godly and Spiritual Sangs for Avoiding of Sinne and Harlotrie." Allan Ramsay (1686-1758) is the author of a collection of songs and short essays, entitled "Gentle Shepherd." Many songs, ballads, essays, and other productions belong to that period. Subsequently Scottish literature became interwoven with that of England, and an account of it will be found in the subject under English literature. Among the prominent writers of Scottish descent are Sir Walter Scott, Hector Macneill, James Hogg, Fergusson, Burns, Ramsay, John Galt, and George MacDonald.

HISTORY. The early history of Scotland is wrapped in obscurity and tradition, and the first definite information regarding its people dates from the time when Britain was occupied by the Romans. It appears that the early inhabitants were non-Aryan, closely resembling the Iberians. Later the Scoti, or Scots, invaded the country from Ireland, forming settlements in the northern part of England and the southern part of Scotland. The descendants from the original inhabitants became known as Picts, but they were called Caledonians by the Romans and the country was known as Caledonia. The Picts were most numerous in the latter part of the 5th century and with the colonization of the Scots, a Celtic people, a long line of controversies arose between these two predominating classes. In the 4th century a large Teutonic element from the north of Germany formed colonies near the Firth of Forth, which finally resulted in annexing the region south to the kingdom of Northumbria, whose boundaries extended from the Forth to the Humber River. In the meantime the Norsemen were establishing themselves on the Orkney and Hebrides islands.

The Picts and Scots were united into one kingdom under Kenneth MacAlpin, a Scottish ruler of Pictish descent, in the 9th century, and soon after the country became known as Scotland. Thirty-eight Pictish kings appear to have reigned and are mentioned in the history of Scotland, but in the latter part of the 9th century the Scots became the predominating influence and slowly united the independent chiefs in the north of Scotland to their dominion. Subsequently followed a long period of wars against the Norsemen on the north and the Britons and Saxons on the south. In 937 the Scottish king, Constantine, aided the Danes in a battle against the Saxon king, Athelstan, this being the first battle of importance fought on English soil. Malcolm I. (943-954) conducted a successful war against Edmund I. of England, which resulted in Cumbria being annexed to Scotland, and in 1018 Lothian, formerly a part of Northumbria, was annexed to England by Edmund II. The three succeeding kings of Scotland are Malcolm II., Duncan, and Macbeth, whose history is made a part of the tragedy of Shakespeare. Malcolm III. ascended the throne in 1057, after defeating the usurper Macbeth at Lumphanan, and with his reign

commenced a social and political revolution in Scotland. He married the English princess, Margaret, sister of Edgar Atheling of England, and thus the English language and customs were introduced.

At that time occurred the conquest of England by William the Conqueror, which was followed by a large number of Saxons leaving England and forming settlements in Scotland. Many serious struggles took place between Malcolm and the Norman invaders of England. He made two successful invasions of England, but William soon collected a large army and invaded Scotland, which resulted in a loss of territory to the former, and Malcolm and his eldest son were slain in 1093 while attempting to seize Alnwick Castle. Malcolm was succeeded by his three sons, Edgar, Alexander, and David. Of these David was the most successful. He reigned from 1124 to 1153, devoting himself earnestly to internal improvements and the spread of the Christian religion. When he ascended the throne Scotland had only a primitive civilization, but he founded schools, introduced a system of written laws, organized a representative legislature, and established the manners and language of the Teutonic race. He was succeeded by Malcolm IV. (1153-1165), in whose reign Cumberland and Northumberland were annexed to England. The latter was succeeded by William the Lion, who was taken prisoner in 1175 while attempting to regain Northumberland, and Scotland was declared dependent on England.

Scottish independence was restored in 1189 by Richard I., and at the death of William, in 1214, Alexander II. (1214-1249) succeeded to the throne. He was succeeded by his son, Alexander III. (1249-1286), whose reign gave importance and prosperity to Scotland, but his sudden death brought on the ambitious designs of Edward I. of England to make Scotland a part of his kingdom, as he had Wales. The situation was further complicated by the death of Margaret of Norway, who had been selected for the crown at a meeting of the estates of Scone, and soon after followed the long struggle of John Baliol, Robert Bruce, and David de Hastings. The dispute was settled by arbitra-tion under Edward I. of England. He decided in favor of Baliol, who received the crown at Scone in 1292. Edward soon after invaded Scotland, took the king prisoner, and placed the entire country under English officials and garrisons. William Wallace and Robert Bruce now raised large armies to throw off English occuration and Edward I., dying in the meantime, was succeeded by Edward II. The latter was defeated by the Scots under Bruce at the Battle of Bannockburn on June 24, 1314, and Bruce reigned with remarkable success until his death in 1329, as Robert I.

Robert I. was succeeded by his son, David II., but Edward Baliol, son of John Baliol,

made pretentions to the throne and received powerful support from Edward III. of England. He was successful in a number of battles and was crowned at Scone in 1322, but David succeeded in defeating him shortly after and continued the war against England. He was succeeded in 1370 by his son, Robert II., who was the first Stuart on the throne of Scotland. After his death in 1390, his son, Robert III., succeeded to the throne, and at his death, in 1406, James I. became king under the regency of the Duke of Albany. Internal strife greatly disturbed the kingdom and resulted in James being held a prisoner in England for eighteen years, where he secured a liberal education and finally obtained his release, receiving the crown at Scone in 1423. He reformed the constitution of the parliament and established obedience to law, but was murdered at Perth in 1437. His son succeeded to the throne as James II. when only seven years of age, which again placed the country under a regency, and he was killed in the siege of Roxburgh Castle in 1460.

James III., now only eight years of age, became king. He married Margaret, daughter of the Norse king, Christian, and received the Shetland and Orkney islands, which have ever since belonged to Scotland. His reign was generally successful, but it was disturbed by the pretentions of the nobles, which finally resulted in a battle and his death at Sauchieburn in 1488. He was succeeded by his son, James IV., who, in 1503, married Margaret, daughter of Henry VII. of England, thus hastening the union of the two kingdoms. James formed an alliance with France and invaded England in the reign of Henry VIII., which resulted in his defeat and death at Flodden Field in 1513. His infant son succeeded him as James V., when only two years of age, under the regency of the Duke of Albany, but in 1528 attained to full government. The chief events of his reign include those in connection with the war against England, in which he was finally defeated at Solway Moss. He died a few days later at Caerlaverock Castle, on Dec. 14,

James V. was succeeded by his infant daughter Mary, who was born a few days before his death. Her reign is famous for the Reformation in Scotland and because of extended discussions regarding the question of uniting Scotland and England. She was affianced to the dauphin of France and sent to Paris to be educated, the government at home being conducted under the regency of her mother. Her marriage with the dauphin was celebrated in 1558, but his death two years later caused her to return to Scotland, where she found two wellorganized parties, the Reformed party under the leadership of her half-brother, the Earl of Moray, and John Knox, and the Roman Catholics headed by Huntly. Her unfortunate marriage to Darnley, in 1565, lost her the support of the Reformed party. Shortly after the murder of her husband she married Bothwell, which caused a large number of her subjects to become alienated. After vainly attempting to defend her rights against a strong confederacy at Loch Leven Castle, she was forced to abdicate in favor of her infant son, who, in 1567, became king under the regency of Moray. Soon after she attempted to recover the throne, but her forces were defeated and she escaped to England, where she was kept a prisoner for eighteen years by Elizabeth, and in 1587 was beheaded at Fotheringay Castle. Her son assumed the title of James VI., and on the death of Elizabeth, in 1603, succeeded to the throne of England, being the nearest heir. He is known as James I. of England. On receiving the crown at Westminster he assumed the title of King of Great Britain, France, and Ireland.

At the death of James VI., in 1625, the throne passed to Charles I., whose reign was disturbed greatly by foreign wars and internal troubles, and ended in his execution in 1649. His son, Charles II., became king under the promise that he would espouse the cause of the Covenanters, and landed in Scotland in 1650, but his reign was disturbed by the events attending the protectorate under Cromwell, and he was finally defeated at Drumclog in 1679. On his death, in 1685, he was succeeded by his brother as James VII. of Scotland and II. of England. His short reign was disturbed by religious dissensions. In 1689 William and Mary were placed on the throne by the Revolution, and they were succeeded by Queen Anne in 1702. The last meeting of the parliament of Scotland was held in 1706, when articles for the final union between Scotland and England were drawn up. This was the result of the general feeling that peace could not be maintained for any considerable time with the two countries separated. Among the conditions provided were that the name of the united country should be Great Britain, that the Presbyterian Church of Scotland should be maintained, that the crown of the United Kingdom should be vested in the Electress Sophia of Hanover and her heirs, being Protestants, that the laws and customs relating to property and private rights should be maintained in Scotland, that there should be free intercourse, equal trade, and citizen rights between the two countries, and that 16 peers and 45 members of the House of Commons should represent Scotland in the national Parliament in London. After that time the history of Scotland is merged into that of England and Great Britain.

SCOTT, David, historical painter, born in Edinburgh, Scotland, Oct. 10, 1806; died March 5, 1849. He was the son of Robert Scott, an engraver, who instructed him in landscape engraving, but soon he developed talent as a painter. His first display was made in 1828,

when he exhibited in Edinburgh his paintings entitled "Hopes of Early Genius," "Adam and Eve," and "Sarpedon Carried by Sleep and Death." In 1829 he became a member of the Scottish Academy, but soon after went to Rome to come in touch with the works of noted artists in the galleries of Italy. His paintings include illustrations of the "Ancient Mariner" and of "Pilgrim's Progress." Among his best known works are "Queen Elizabeth at the Theater," "Monograms of Man," "Nimrod," "Vasco da Gama Encountering the Spirit of the Cape," and "Cain." He wrote a number of articles for Blackwood's Magazine in the period from 1839 to 1841.

SCOTT, Duncan Campbell, poet, born in Ottawa, Ontario, Aug. 2, 1862. He studied in the common schools and at Stanstead Wesleyan College and in 1879 entered the civil service of Canada. Efficient work caused him to be promoted rapidly, and in 1893 he was made chief clerk accountant in the department of Indian affairs. Besides contributing to many magazines, he was an editor of the series entitled "The Makers of Canada." His books include "Labor and the Angel," "New World Lyrics and Ballads," "The Magic House," and "In the Village of Viger."

SCOTT, Sir Walter, eminent novelist, born in Edinburgh, Scotland, Aug. 15, 1771; died at Abbotsford, Sept. 21, 1832. He descended from

a family of excellent standing and, though feeble as a child, he matured as a man of robust health and strength. After attending the high school of Edinburgh, he entered the university in that city, where he graduated. He was not distinguished as a student, but was famous among his



SIR WALTER SCOTT.

fellows for ingenuity in telling stories. After leaving the university, he began to practice the profession of law, being admitted to the bar in 1792. Law had little charm for him and his attention was soon attracted to English, German, and Italian authors. His first work as an author was in making translations from the German. These included Bürger's "Lenore" and "Der Wilde Jager" (The Wild Huntsman), which met with success on being published in 1796. When a youth he had spent a part of his time at the farm of his grandfather near Kelso, where he became acquainted with legends, ruins, and historic localities. These he turned to good account in his ballads of "Glenfinlas" and the "Minstrelsy of the Scot-

tish Border," the latter appearing in three volumes in 1802.

He attained marked popularity in 1805 by publishing "The Lay of the Last Minstrel," a production written in an original ballad style. After publishing his "Marmion," in 1808, and "The Lady of the Lake," in 1810, he was offered the position of poet laureate, but declined that honor in favor of Robert Southey. Other poetical works written about the same time include "Lord of the Isles," "Vision of Don Roderick," "Harold the Dauntless," "Bridal of Triermain," "Doom of Devorgoil," and "Halidon Hill." However, his popularity as a poet declined somewhat, partly because he was not fortunate in selecting the theme for his poem "Rokeby," and partly because of the eclipsing glory of Byron's genius, and hence entered the field of the novelist. In 1814 he published the first of the "Waverley Novels," which established an epoch in modern literature. Scott concealed the name of the author, but their popularity was such that the writer was spoken of as "The Great Unknown." Among the most popular of these novels are "Rob Roy,"
"Old Mortality," "Ivanhoe," "Guy Mannering," "Heart of Midlothian," and "Black Dwarf." His literary work proved highly profitable and he purchased a farm of 100 acres on the Tweed River, about three miles above Melrose, in 1818. As his resources increased, it was enlarged from time to time until he possessed an estate that became known as Abbotsford. Large sums of money were spent to improve this materially, and he showed remarkable liberality in aiding persons ambitious to become scholars and writers.

Scott had a partner in the publication of his books, the firm being known as Ballantyne & Co., but in 1825 it became involved through the failure of Constable & Co., Edinburgh publishers. His liabilities resulting from the failure amounted to \$650,000, but he declined the help of friends and an offer of compromise made by his creditors, preferring to make an effort to liquidate all obligations by his writings. Soon after he removed to Edinburgh, where he worked with remarkable industry on his later writings, which include "Life of Napoleon," the novel "Woodstock," and a series of tales from Scottish history entitled "Tales of a Grandfather." It was possible to pay his creditors \$200,000 within a short time. Excessive exertion made it necessary to visit Italy on account of failing health, but he was soon taken back to Abbotsford and died shortly after. His writings and copyrights brought in sufficient to pay off all his debts. He was buried in an aisle in Dryburgh Abbey.

Scott was a genial Scotchman, beloved by his neighbors and contemporaries, and noted alike for his honesty, kindness, and hospitality. As a story teller he has scarcely an equal, and his writings are popular among all classes of readers. His poems have made the scenery of Scotland famous. All his writings have a good moral tone and tend to promote a sense of honor and a manly dignity of character. Among the honors bestowed upon him was a baronetcy by George IV. in 1820, and he was fitnigly remembered by many important societies and associations. His best biography was written by John Gibson Lockhart, his son-in-law.

SCOTT, Winfield, distinguished general, born in Petersburg, Va., June 13, 1786; died at West Point, N. Y., May 29, 1866. He was

educated at William and Mary College, studied law and was admitted to the bar. In 1808 he entered the army as captain, and at the beginning of the War of 1812 was sent on an expedition into Canada. He fought



WINFIELD SCOTT.

with great bravery at Lundy's Lane and Queenstown, but was taken prisoner in the latter engagement. After being exchanged, he was promoted to the rank of major general and distinguished himself at the battles of Chippewa and Bridgewater, in 1814. He saw no active service after this until the nullification excitement in South Carolina, when he commanded at Charleston, and subsequently served against the Seminoles and Creeks. In 1841 he was made commander in chief of the United States army, and as such took charge of the Federal forces in the second year of the Mexican War, in 1847. After conducting a siege at Vera Cruz, he captured it, and in rapid succession took Cerro Gordo, Jalapa, and Puebla. Shortly after he won the victories of Contreras, Churubusco, and Chapultepec. On Sept. 14, 1847, he entered the City of Mexico, which he held until the treaty of peace was concluded in 1848. The Whigs nominated him for President in 1852, but he was defeated by Franklin Pierce, his Democratic opponent. Soon after he was commissioned to aid in rectifying the boundary line between the United States and Canada. He was still in command of the army at the beginning of the Civil War, but resigned the position in October, 1861. Scott was a man of imposing stature and enforced strict military discipline.

SCRANTON (skrăn'tŭn), the third city of Pennsylvania, county seat of Lackawanna County, in the northeastern part of the State. It is on the Lackawanna River, 160 miles north of Philadelphia, and has communication by the Erie, the Central of New Jersey, the Delaware

and Hudson, the Delaware, Lackawanna and Western, and other railroads. The city occupies a fine site on high and undulating land and has an area of twenty square miles. The streets are broad and well paved with stone and macadam. Electric street railways furnish transportation facilities to all parts of the city, and are connected with lines that penetrate the Wyoming valley and other sections of the country.

Scranton has several fine public parks and the residential sections are beautified by lawns and avenues of trees. Within the public square is a fine county courthouse. Other buildings of note include the city hall, the post office, the Everhart Museum, the Albright Memorial Library, the Board of Trade, the Masonic Temple, the Jermyn Hotel, and the Connell Building. About forty public school buildings of modern construction are maintained. It has the Taylor Hospital, the Home for the Friend-

less, several colleges and academies, the International School of Correspondence, and many fine church edifices.

The surrounding country produces vast quantities of anthracite coal, of which it is an important distributing point. It has a large wholesaling and jobbing trade in merchandise and manufactures, and is an important market for fruits, cereals, and live stock. The manufactures represent a total capital of \$32,500,000. They include extensive knitting and lace curtain mills, iron foundries, locomotive works, and machine shops. Among the general manufactures are hardware, clothing, earthenware, glass, carpets, musical instru-

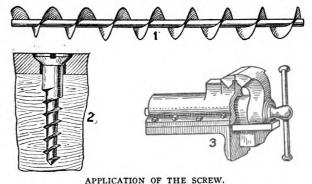
ments, and spirituous liquors. Waterworks, sewerage, and gas and electric lighting are among the public utilities.

The first settlement in the vicinity of Scranton was made in 1788 by Philip Abbot of Connecticut, who opened a farm on the Roaring Brook, a tributary of the Lackawanna. It was named Slocum Hollow in 1799 from a family of that name. Two brothers, Joseph and George Scranton, founded the city in 1840 and named it. It was incorporated as a borough in 1854 and chartered as a city in 1866. The rapid growth is due to the development of its manufacturing and mining interests. Population, 1900, 102,026; in 1910, 129,867.

SCREAMER (skrem'er), a class of wading birds native to South America. In habits they somewhat resemble the duck, but do not have webbed feet. They have large feet, a short, conical bill, a bare space around the eyes, and two spurs on each wing. The color is blackish-brown and the size is nearly that of a turkey. Screamers frequent swamps and marshes, where they feed on insects, water plants, and seeds. The horned screamer has a long, slender horn on the top of the head. It is nearly four feet

long and is seen mostly near the sea. These birds are found in large numbers in Brazil, Guiana, Venezuela, and other countries of South America. They are so named from their loud and harsh cry.

SCREW, one of the six mechanical powers, which is a modification of the inclined plane. It consists of a wooden or metal cylinder, called the male screw, having a groove or thread in an advancing spiral on its outer surface. It may be used separately, as in fastening metal to wood, but in fastening objects to metal a female screw is used in connection with a male screw corresponding in diametrical size and cut of the spiral ridge. If one be turned while the other remains fixed, as in the vise, there is an advance equal to the distance between two connective threads. The mechanical effect is increased by making the threads finer, or decreasing the distance between them, or by increasing the length of the lever by which



1. Screw conveyor; 2. common wood screw; 3, metallic vise.

the power is applied. If the power moves through a circumference of thirty inches and the distance between two consecutive threads is one-tenth of an inch, a force of one pound applied at the head of the screw will move a weight of 300 pounds at the other end, since the power moves through a distance 300 times as great as that which the weight moves. Equilibrium results when the circumference at which the force is applied bears the same proportion to the pitch of the screw as the distance bears to the applied force. Thus friction enters very largely as a modifying element. Many forms of the screw are employed in machinery and mechanical arts. In general it is used to exert great pressure or overcome great pressure through a short distance. Among the common forms are the screw nail, for fastening separate pieces of material; the gimlet, for boring; and the screw presses and jack-screws, for securing pressure. Other forms include the endless screw, ball screw, screw conveyor, Archimedian screw, screw propeller, etc.

SCREW PINE, or Pandanus, a genus of tropical plants in the Eastern Hemisphere, so named from their spiny-edged leaves. They

include both shrubs and trees and bear some resemblance to the palms. The leaves are two or three feet long, are shaped similar to a sword, and occur in three spirally arranged When without branches, they resemble neapple plants. The common screw pine the pineapple plants. grows to a height of 25 feet and thrives in a poor but moist soil. Natives gather the unexpanded flowers as articles of food, and the odor of the bloom is utilized in making per-An allied species grows somewhat taller and has leaves from six to ten feet long. The leaves yield fibers that are of value in making gunny bags. These trees are most abundant in the southern part of Asia and the East Indies. Some species are grown as ornamental plants in greenhouses.

SCREW PROPELLER, a contrivance used in the construction of sailing vessels of various kinds. It utilizes the principle of the screw in acting upon the water, for which purpose it is driven rapidly by steam power. It consists of a cylindrical or spherical hub, to which blades are attached so as to form the screw. Some are cast in one piece, while others are built up by bolting the blades to the hub, both being of bronze, iron, or steel. The shaft is made very strong and passes parallel to the keel into the engine room, where the steam is applied to cause it to revolve rapidly. Back of the ship, projecting from the stern, is the screw, usually submerged entirely below the surface of the water. One or more engines act upon the shaft either by cranks formed on the shaft or by means of geared wheels. The screw turns in the water as a bolt turns in a nut, but the pitch is not constant at all points, since it varies somewhat near the hub. No absolute rule can be given in reference to the diameter of the screw, which varies somewhat according to the speed desired and the size of the vessel to be propelled. Patents on screw propellers were awarded independently to John Ericsson and F. P. Smith in 1838, from which time the successful introduction may be said to date. The screw came into general use in 1870 and it is now the propeller employed generally, except where the water is too shallow.

SCRIBE, an order of teachers among the ancient Jews, whose office was to write and teach the Mosaic and traditional law. The name was first applied to military secretaries, who kept the records of the nation, recruited and organized troops, and levied the war taxes. At the time of the Babylonian captivity the language in which the law was written had become obsolete and a new order of scribes had arisen among the Levites, of whom Ezra was chief. To them was intrusted the task of transcribing and translating the law, and of applying it to conduct. They grew rapidly to influence, and at the time of Christ comprised the learned body of the nation, when they were looked upon as public teachers and

lawyers. Their rank was in accordance with their talents. The higher class occupied a place in the sanhedrim, practiced law, or taught in schools, while the less gifted engaged more largely in transcribing and writing laws. The scribes united with the chief priests in plotting the death of Christ.

SCRIBE (skrèb), Augustin Eugène, dramatist, born in Paris, France, Dec. 24, 1791; died Feb. 20, 1861. He studied law, but afterward turned his attention to the stage. In 1816 he began to write songs and small comedies, but soon developed great ability as a playwright. His productions include about 100 plays in three to five acts and 150 plays of one act, mostly sentimental or satirical comedies. He produced plays that were presented in the leading countries of Europe and America. His best known works include "Bertrand et Raton," "Adrienne Lecouvreur," "Le Diplomate," and "The Glass of Water."

SCROFULA (skrŏf't-là), a constitutional disease, either hereditary or acquired, leading up to the formation of tubercles in various tissues and organs of the body, chiefly in the lymphatic glands. It is generally inherited and is attended by glandular tumors that degenerate into ulcers, particularly at the side of the neck and under the angles of the jaw. The disease has a disposition to degenerate into consumption of the lungs or of the mesentery, a fold of the peritoneum that infests an intestine or other viscus and connects it with the abdominal wall. Scrofula is sometimes called king's evil, from the view long held in England that scrofulous tumors and abscesses could be cured by the king's touch.

SCRUPLE (skru'p'1), a weight equal to onethird of a dram, or the 24th part of an ounce, as used in apothecaries weight. A scruple is equal to 20 grains.

SCUDDER (skud'der), Horace Elisha, teacher and author, born in Boston, Mass., Oct. 16, 1838; died Jan. 11, 1902. He graduated from Williams College in 1858 and soon after entered the public schools of New York City as a teacher, where he did efficient work for three years. In 1862 he published "Seven Little People and Their Friends," a work that proved sufficiently successful to induce him to take up literature as a profession. He was editor of The Riverside Magazine for Young People from 1867 to 1870 and in 1890 removed to Cambridge, where he became the editor of the Atlantic Monthly. His numerous writings include "Dream Children," "Stories from My Attic," "Dwellers in Five-Sisters Court," "History of the United States," "Men and Letters," a monograph on "Noah Webster," and "Biography of Washington." He edited the American Commonwealth Series and with Mrs. Bayard Taylor published "Life and Letters of Bayard

SCULPTURE (skulp'tur), the art of imi-

tating natural objects, chiefly the human body, by carving or chiseling figures from stone or other solid material, or of modeling them in some plastic substance for subsequent reproduction by carving or casting, as in bronze. The word is from a Latin term meaning to cut out or carve, but it is used to express the molding of figures in clay, wax, or other material, to be afterward cast in some metal or plaster.

Sculptures are of two classes, PROCESSES. known as sculpture proper and relief. In sculpture proper the three dimensions of length, breadth, and height are reproduced, while in relief the dimension of thickness or depth is relatively reduced. Different names are applied to productions in relief according to the depth in which the object is represented. Bas-relief is a common form and is a type of carving or sculpture in which the figure projects but slightly above the background. Mezzo-rilievo is a type of sculpture in half-relief, and altorilievo is a form in which the carving or figures stand out very strongly from the background.

MATERIALS AND METHODS. The materials generally used in sculpturing include marble, stone, ivory, gold, bronze, granite, and wood, but any substance that may be cut or molded into form is employed for various products. The art has many disadvantages as compared with painting in recording facts and representing ideas, since neither color nor picturesque backgrounds may be utilized in sculpture, though there are exceptions to this general rule. While paintings appeal to the sense of sight chiefly through color, sculptures rely wholly upon pure form, both of line and composition, thus differing from painting in the mode of In modern sculpture the artist expression. usually models his work in moist clay, which in the case of a large statue is supported by a skeleton framework. If the finished product is to be in marble, a plaster cast is made from this model, which a skilled workman uses in preparing a copy, while the sculptor puts on the finishing touches.

HISTORY. Sculpture is one of the most ancient of arts. Its origin is lost in antiquity. The first productions were in clay, but as knowledge advanced other materials, such as wax, marble, and bronze, came into use. It is remarkable that the most ancient sculptors did not seek to represent natural figures, but instead connected their products with mythology and religion, thus producing representations of strange and fantastic figures. The Egyptians made the earliest forms of higher art, and their sculptures differ from those of China and India in representing men engaged in various industries instead of confining them to gods and deformities of the human figure. Most of their products are large, and are peculiar for symmetry, stability, and calm and solemn expression. most distinct and dignified sculptures of Egypt

date from the period included between 1500 and 1000 B. C., but there are large and remarkable productions dating much earlier, particularly the Sphinx, which is thought to date from about 4000 B. c. Assyrian sculpture is like that of Egypt in representing historical and general scenes. While more vigorous in spirit, it is much inferior in idealistic beauty and trueness to nature. It dates from the 9th and 10th centuries B. C. Persian sculpture reached its height of development in the period from 575 to 331 B. C., but is less beautiful and artistic than the The early sculptures of India are Assyrian. chiefly in connection with the religion of Buddhism and later Brahmanism, and all may be said to be inferior as art products. While the works of art produced in Egypt and Asia are of interest historically, they are particularly valuable as influencing the development of art among the Grecians, who carried sculpture to the highest perfection.

The first forms of Grecian art bear a close resemblance to those of the East, but by the 6th century B. C. a distinct school developed, and their artists began to replace the conventional and lifeless types of Eastern sculptures with human figures true to nature. Among the earliest works of Grecian art that have come down to us are the sculptures from the temple of Athena at Aegina, which date from about 475 B. C. A number of them are preserved in the museum at Munich, Germany. Phidias carried Grecian art to its highest perfection about 442 B. C. His most notable productions are the statues of Athene in the Parthenon and that of Zeus in the temple at Olympia. Sculpture in his time still retained connection with mythology, but it showed remarkable nearness in imitating nature, thus furnishing beautiful specimens of art in which human beauty was characterized by spiritual and godlike perfec-Sculpture declined for nearly a century after the time of Phidias, but new interest was awakened by Praxiteles about 363 B. C. sculptor began to represent the human body more fully than the workmen prior to his time, and he was the first of the great artists to represent human form quite nude. Other noted artists of Greece include Scopas, who made the "Niobe Group," now at Florence; Chares, the author of the famous "Colossus of Rhodes;" and Agasias, the sculptor of the "Fighting Gladiator." Other productions dating from about the 4th century B. c. include the celebrated group of the "Laocoön," "Apollo Belvedere," "Venus of Milo," "Dying Gladiator," and "Dying Alexander."

Roman sculpture may be attributed wholly to Grecian artists, who found employment in all parts of Italy after the Roman conquest The Romans carried the finest treasures of art from Greece to Rome, whence many of the valuable specimens were transported to Byzantium in the 4th century A. D.

by Constantine. Art declined in Italy with the barbaric invasions from the north. It began to revive in the 10th century, but no material advancement was made until the early part of the 13th century, when Nicola Pisano carved a number of fine specimens of art at Pisa and Siena. His son, Giovanni, is the next artist of note, but the most marked progress in the revival of art began with Lorenzo Ghiberti (1381-1455), who made the wonderful doors of the baptistry of Florence. Donatello is noted for his statues of Saint George and Saint Mark. Verrocchio is the most famous sculptor of the 15th century, but the perfection of Italian art was reached in the sculptures of Michael Angelo in the 16th century. Lorenzo Bernini (1598-1680) is one of the most noted Italian sculptors of the 17th century. Canova is the greatest representative of the 18th century, and Monteverde and Gallori are the most prominent of the 19th.

Sculpture found its way from Italy toward the north and west with remarkable rapidity at the beginning of the revival of learning. At present there are representative schools in the different European and American countries. Among the noted sculptors of Germany are Albert Dürer, Peter Vischer, Rauch, Kiss, Bandel, Siemering, Drake, and Schilling. The sculptors of France include Jean Goujon, Pierre Puget, Rodin, Dubois, Houdon, and Mercié; those of Denmark, Thorwaldsen; and those of England, John Flaxman, John Gibson, Alfred Stevens, Watts, Gilbert, and John Henry Foley. The most eminent sculptors of the United States include Crawford, Greenough, Clevenger, Bartholomew, Rinehart, Keyser, Niehaus, Taft, French, Saint Gaudens, Story, Ward, Thompson, Hosmer, Rogers, and Warner. For further information consult the articles treating of the sculptors mentioned above.

SCURVY (skûr'vy), or Scorbutus, the name of a constitutional disease, due chiefly to the use of impure water and salt meat for a long period of time. Persons who subsist on a mixture of fresh vegetables and animal food are not subject to the malady. Those suffering from the disease experience great weakness, the face becomes sunken, and the gums relax and appear dark and spongy. Purple spots or patches appear upon the skin, due to an effusion of blood beneath the true skin or between superficial muscles, and these spots are not only painful but sometimes develop into ulcers. In the last stages the patient bleeds at the nose and vomits blood, and finally death occurs from exhaustion. Formerly scurvy was very devastating in the navies and merchant marine of all nations. It is now of rare occurrence, except among the poor and careless. Cleanliness, wholesome food, and proper dieting avert the disease entirely.

SCUTARI (skoo'tä-rē), a city of Asiatic Turkey, on the eastern shore of the Bosporus, opposite Constantinople. It occupies a fine site on slopes gradually rising from the water, has good railroad facilities, and is the seat of a large interior and foreign trade. Scutari has many beautiful mosques, baths, and bazaars, and is the seat of several educational institutions, including a dervish college. Its extensive cemeteries are famed for their beauty, being adorned with magnificent cypress trees and works of art. The high degree of interest in the cemeteries is due to the fact that the Turks look upon Asiatic soil as sacred, in which they desire to have their last resting place. Scutari is well fortified. It has a large trade in cereals and fruits. Among the manufactures are cotton textiles, silk and woolen goods, saddlery, implements, and machinery. The English occupied Scutari in the Crimean War. Immediately south of it is the burial ground established for the soldiers of the British army. Florence Nightingale made it the basis of her operations during that war, and in the burial ground is a beautiful monument in honor of the troops. Population, 1908, 78,485.

SCYLLA AND CHARYBDIS (sĭl'là and kā-rīb'dīs), two personages described by Homer, who regarded them highly dangerous to navigators. Scylla is at present the name of a rock in the Strait of Messina, on the western coast of the southern part of Italy, and near it, nearly opposite the entrance of the harbor of Messina, Sicily, is the celebrated whirlpool of Charybdis. The ancients associated the legend of Scylla and Charybdis with these two dangerous obstructions, representing Scylla as a monster with twelve feet and six mouths. According to their view, Charybdis three times each day sucked down the water of the sea, and as often threw it up. When Ulysses passed the terrible dangers of Scylla and Charybdis, the former swooped down and seized six of his crew from the deck. From this circumstance arose the proverb, "To shun Charybdis and fall into Scylla."

SCYTHE (sith), an implement used for mowing and reaping. It consists of a long, curved blade attached to a handle. The blade is sharpened on its inner or concave side, and is swung with both hands, the workman holding it by two smaller handles attached to the principal one. The scythe was preceded in general use by the sickle, an instrument with a short curved blade and a wooden handle, to be held in one hand when reaping. Later a framework of wooden bars was fastened above the blade of the scythe, thus forming the cradle. The scythe is used mostly in cutting grass and weeds on small farms and the cradle has taken its place in cutting grain. These implements are generally used in countries where farming is on a small scale or in a primitive state, the reaper having taken their place in all leading However, all wellagricultural countries. equipped farms have a scythe for various pur-

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poses, such as cutting weeds and grasses where a mower cannot be used.

SCYTHIANS (sith'i-anz), the name of a race of people that anciently occupied the region from the Carpathian Mountains in Europe to the Aral Sea in Asia, where they were found by the Greeks when settling on the northern shore of the Black Sea, in the 7th century B. C. Ancient writers used the name with considerable vagueness, often associating it with the Scoloti and other nomadic tribes, but the name Scythian was applied generally to the wandering tribes that occupied the region between the Carpathians and the Volga. These people led a wandering life, subsisting by rearing large herds of cattle, sheep, and horses. Their food consisted of cheese, milk, and boiled flesh, and their habitations were in wagons roofed with felt and drawn by oxen. As the food supply of one region became exhausted, they moved to newer pasture, their horses and cattle following, and later their sheep. The government was despotic. It was vested in a number of chiefs. Their warriors developed remarkable skill in handling the bow and arrow on

A large army of Scythians invaded Media in the latter part of the 7th century B. c., which they made subject for ten years, but were finally expelled by Cyaxares. In the 2d century B. c. they invaded Persia, where they founded a kingdom known as Indo-Scythia, and in the 1st century B. c. they secured a foothold in northern India, which they occupied about four centuries. Grecian writers regarded the Scythian language of Aryan derivation and as nearly akin to the Iranian. Scythia was the name of the region lying between the Volga and the frontier of India in the time of the Roman Empire.

SEA, or Ocean, the great body of salt water which covers about three-fifths of the earth's surface. It is one continuous expanse of water, but for the purpose of description and study it is generally divided into five smaller bodies. They are known as the Pacific, Atlantic, Indian, Arctic, and Antarctic oceans. The Pacific separates America from Australia and Asia, the Atlantic separates America from Europe and Africa, the Indian lies between Africa and Australia, and the Arctic and Antarctic lie respectively within the north and south polar circles. The comparative sizes may be stated in the following order: one-half of the entire water area of the earth is included in the Pacific, one-fourth in the Atlantic, one-fifth in the Indian, one-seventeenth in the Antarctic, and one-thirty-fifth in the Arctic.

The coast lines of the ocean are variously formed, but they may be arranged in the four classes which constitute inland seas, border seas, gulfs and bays, and fiords. *Inland seas* are those formed by a nearly continuous land border, as the Gulf of Mexico and the Red Sea; border seas are isolated from the rest of

the ocean by island chains and peninsulas, as the Gulf of Saint Lawrence and the Sea of Japan; gulfs and bays are broad expansions of the water extending but a small distance into the land, as the Bay of Biscay and the Gulf of Guinea; and fiords are deep inlets with high, rocky headlands, extending often from 40 to 100 miles into the land, as are found off the coasts of Norway and Chile.

The bed of the ocean is diversified like the surface of the land, having plains, mountains, rocks, and valleys, though the irregularities are fewer. It has been demonstrated by recent soundings that many of the plains and plateaus of the ocean are of great size, compared with those of the continents, and there are submerged mountain ranges both along the shores and in the deep ocean. The mean depth of the ocean is placed at 12,600 feet, or nearly two and a fourth miles. It is thought that the greatest depth of the Atlantic is in the neighborhood of the island of Saint Thomas, in the West Indies, where soundings have been established a depth of 27,300 feet. The deepest region in the Pacific Ocean is east of Japan, where a depth of 27,935 feet has been reached, this being somewhat less than the highest elevation of the land. It is found that the greatest depths are near the highest elevations, though there are some possible exceptions. The entire bulk of water in the ocean is placed at 323,-813,000 cubic miles. It is estimated that if the surface of the earth were perfectly level a sheet of water two miles deep would entirely surround the crust.

Sea water in small quantities is transparent and colorless, but when viewed in a large mass it has a deep blue appearance. The reddish or greenish hue often seen in limited portions of the ocean is due to the presence of numberless organisms and the phosphorescence visible at night in some places arises from the presence of animalculae, but the latter phenomenon appears only where the air comes in contact with the water, as in the crests of waves or the disturbance of the surface due to the passage of a vessel. Sea water is heavier than fresh water in the proportion of 1.027 to 1, owing to its containing a number of saline ingredients. About three pounds of various saline matters are found to every hundred pounds of ocean water. The saltness of the ocean is due to the evaporation taking up pure water, which is borne in the form of clouds to remote regions and dropped to the surface of the earth in the form of rain, which, as it flows through the channels of streams, carries large quantities of mineral matters into the sea. It is estimated that about 6,575 cubic miles of water are taken up in this way annually. Thus, it is not difficult to understand that large quantities of mineral ingredients are dissolved from the crust of the earth and carried with the current.

Oceanic water is affected constantly by vast

movements, which correspond to the motions of the atmospheric air. They are known as waves, tides, and currents. Waves are swaying movements of the water, caused by the action of the wind. Apparently the wave motion is in the direction in which the wave is advancing, but there is no perceptible progressive movement of the water, except in shallows. The height of waves depends upon nearness to the shore and the depth of the sea, ranging usually not over six feet in the open sea with a moderate wind, and in high storms from thirty to sixty feet. The wave motion decreases rapidly in proportion to the depth below the surface, and there is a very feeble effect at a depth of forty feet, even in moderately strong winds. Tides are the periodical risings and fallings of the water, caused by the attraction of the sun These follow each other with and moon. marked regularity about every six hours, and, unlike waves, whose motion is confined practically to the surface waters, tides influence the waters of the ocean from top to bottom.

Ocean currents affect the water of the sea with considerable regularity, causing it to move to and from the equatorial and polar regions. In this way they constantly produce an interchange of water between the lower and higher latitudes. They somewhat resemble rivers, but are vastly wider and deeper, and, unlike waves, consist in a real onward movement of the water. These currents are caused chiefly by the difference of density of water produced by the inequality of temperature between the equatorial and polar regions. The warmer waters from the equatorial region are upper currents and move both north and south from the Equator, but never cross it, and as they lose their heat they become denser, and, sinking to the bottom, spread throughout the ocean basin. It has been found that there is no perceptible difference in the temperature of the water near the bottom of the sea in any latitude, the extreme difference ranging from four to six degrees. The lowest temperature at the greatest depth near the Equator is about 35° Fahr. and in the highest latitude it reaches about 28° Fahr., while the temperature at the surface varies from 85° Fahr. in the former to 28° Fahr, in the latter region. Ordinary ocean water freezes at 27° Fahr., and in places where it is densely salt the freezing point is still lower. Since ice formed of ocean water is comparatively fresh, it follows that the salt, being separated as the water freezes, increases the per cent. of salt in the lower strata. For this reason the water below the ice may have a temperature lower than that at which the surface freezes, without being transformed into ice.

The constant circulation of water in the ocean causes a general distribution of oxygen and other atmospheric gases throughout the sea, even to the greatest depth. It follows from this that both plant and animal life may sub-

sist in all parts of the sea, but their form and size depend largely upon the depth and temperature. Animal life is most abundant at the surface and near the bottom, but there are living forms throughout the intervening space. The sea has many different species of both plants and animals, some being confined to the bottom, others floating in the water, and still others are in shallows, coming in contact with both the bottom and the surface. Pelagic deposits of matter at the bottom of the sea are remains of the fishes and other forms of life that sink after death. Other deposits, known as terrigenous, are formed of earthy matter carried into the sea by the movements of oceanic waters and through the action of streams.

SEA ANEMONE (à-něm'ô-nê), the name of several animals belonging to the polyps, or zoöphytes, called actinians by some writers. They are low in the scale of life and are fastened at one end to the surface of rocks or stones in the water, but are able to move slowly. At the upper or free extremities are their mouths, which are surrounded by arms or tentacles. The body is vaselike, usually about three inches in diameter, and the height is from three to five inches. They seize their food by the tentacles, which they move outward in all directions, and at the extremity is a stinging cell. When a small fish or shrimp comes in contact with certain tentacles, it is immediately seized and paralyzed by the cells, and is then dragged into the distensible mouth, where it undergoes the first process of digestion. Later the food passes to the lower part of the digestive canal, where it undergoes the final digestive processes. These animals multiply by eggs as well as by budding, and frequently from ten to twenty young forms spring from the base of the adult. Some species are popular in natural collections, where they may be made the subject of a very interesting study.

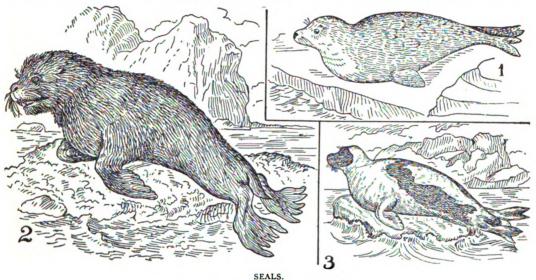
SEA CUCUMBER, or Holothuria, the name of the highest class of radiated animals, so called from their elongated and more or less warty and cylindrical form. Some writers designate them as sea slugs, owing to their vermicular mode of creeping. When parts of the body are destroyed, they are reproduced quite rapidly. The body is rather soft, having no covering like that of the starfishes and sea urchins, and motion is effected principally by longitudinal rows of suckers on the sides of the body. Water introduced and ejected causes motion and enables them to extend the body greatly in length and width. The sexes are distinct and some multiply by means of fissuration, but most species promulgate by means of eggs. In size they vary greatly, ranging from the small species off the New England coast to the large size in the Bay of Fundy and on the shores of Newfoundland. Species from ten inches to a foot in length and from three to

four inches in circumference are found in the mud flats of the Florida reefs.

SEA EAGLE. See Eagle. SEA HORSE. See Hippocampus.

SEAL, the general name of certain genera of carnivorous mammals, having feet adapted for swimming and being able to live both in and out of water. The body is long and slender, tapering toward the tail, and the small head is destitute of outside ears. They have five toes on each limb, joined to each other by webs. The two fore limbs are short and adapted to crawling out of the water, and the hind limbs project backward on each side of the tail. Seals are able to remain under water nearly half an hour, where they pursue their prey by swimming with great rapidity, but their movements on land are awkward. Most of the time is spent in water, but seals congregate a part of value in making articles of wear, such as caps, ladies' cloaks, and trimmings. They are employed to some extent for card cases, pocketbooks, and other articles. The oil, known in the market as seal oil, is made from the fat or blubber, and is more valuable than whale oil. The fur is of a grayish-brown color, mottled with black, and is usually dyed before being used for articles of wear.

Many species of seals have been described, varying somewhat in size, nativity, and habits. The common seal is most abundant in the northern regions. It attains a length of from three to five feet. The female usually produces one young at a birth, but sometimes two. They are animals of considerable intelligence, having large and brilliant eyes and a well-developed sense of smell, and may be trained to perform peculiar tricks when domesticated. It is pos-



1, Common Seal; 2, Sea Lion; 3, Greenland Seal.

of the time on the shores, where they repose and bask in the sunshine on sand banks, ice fields, or rocks. There they bring forth their young. They subsist mostly on fishes, which they pursue with marked skill, often chasing them up the mouths of rivers, but they also feed on crabs and other forms of marine life. In the warm season they move toward the colder regions of the North and South poles, and in winter go to the milder waters.

The seals make holes in the ice in winter, thus enabling them to come up to breathe, where they are often watched by the Esquimos and caught for their flesh and skin. The oil is of value in lighting, warming, and cooking. Their skins are used in making clothes, coverings of capes and coats, and for footwear. The sinews are employed by the natives in making fishing lines and thread. Sealskins form an important commodity of commerce, being

sible to teach them to come when called by name, and to obey instruction of various kinds. The sea lion is a larger species, attaining a length of from ten to twelve feet, and a weight of about 1,000 pounds. It is destitute of fur, but its hide, fat, flesh, sinews, and intestines are useful to the natives and in commerce. Sea lions are found in the North and South Pacific, particularly on the coast of the Kurile Islands, off Kamchatka, and in the vicinity of San Francisco. The harp seal is a species common to the northern part of Europe. The crested seal has a peculiar crest above the nose and is native to the northern parts of North America. A spotted species, known as the leopard seal, is native to the South Orkney Islands. The elephant seal, or sea elephant, is the largest of this class of animals. It is native to the Antarctic seas and attains a length of from twenty to thirty feet. The northern

sea lion is a species having a small outer ear, an extended neck, and a mane of crisp hairs on its neck and shoulders. It is native to Alaska and the Pribilof Islands. An allied species, the fur seal, or sea bear, is native to the polar regions. It has a brown or gray-brown fur of much value.

It requires considerable patience and skill to successfully conduct seal hunting, owing to the gregarious habits of most species, and their tendency to have one or more sentinels constantly watching for danger. The most extensive hair-seal fisheries are off Newfoundland, in the Caspian Sea, and off Jan Mayen, but nearly half the world's supply is secured off Newfoundland. The principal fur-seal fisheries are off the coasts and islands of Alaska and Kamchatka. Seals are most commonly secured by shooting while congregated on the ice, but in some cases they are watched at their holes in the ice and secured by inflicting a wound on the head administered by a club or some similar implement. Reckless destruction of these animals has caused the supply to decrease rapidly. In 1870 about 100,000 seals were taken in the vicinity of Bering Sea, but there has been a general decrease until in 1908 only 22,470 skins were secured in the same region. It is thought that ultimately pelagic sealing, the killing of seals in the deep sea, should be prohibited entirely and that the sealing season on the coasts should be limited to several months, in order to preserve a supply of these animals.

SEALED ORDERS, the term applied to orders issued and delivered to the commanding officer of a ship or squadron, whose seal is not to be broken until the vessel has reached sea. In such cases all on board are ignorant of the destination of the vessel, this being unknown even to the commander. Sealed orders are issued when a ship or squadron is sent on any secret service, the object being to prevent information regarding the movements becoming known

SEALING WAX, a composition for sealing letters or packets, designed both to protect the message and receive the impression of a seal fixed to an instrument. In the Middle Ages sealing wax was made of beeswax and turpentine, and to these was added a coloring matter, usually vermilion. At present beeswax is not used in making sealing wax, but shell-lac is the principal component. The fine grade of sealing wax for stationery contains about seven parts of shell-lac, four of turpentine, and from three to four of vermilion. Inferior grades contain common resin and the coloring used is red lead, but black coloring is not infrequent. Sealing wax was first employed in China in the 7th century, whence it was introduced into Europe.

SEA LION. See Seal.

SEA MOUSE, the name of a small worm found in the sea. It is covered with fine hairs or bristles, hence resembles the mouse in appearance. The body is about two inches in length and when exposed to light the hairs show iridescent hues of great beauty. Several species have been described, some of which are found in the Atlantic at great depths. They are frequently brought to the surface or thrown upon the shore by storms.

SEA OTTER, an animal found off the islands and shores of the North Pacific. It is about three feet long, has a stout form and a massive head, and bears a dark brown fur of value in the market. Formerly these animals were very numerous along the coast from Puget Sound to Bering Strait, but fur traders have hunted them so persistently that they are now becoming rare. The skin of a sea otter is valued at from \$500 to \$1,500. These animals live in the sea a greater part of the time and subsist principally on fish, crabs, and sea urchins.

SEARCH, Right of, the right that a belligerent nation has to examine the papers and cargoes of private ships sailing on the high seas, in order to ascertain their character and designation. The right of search is limited to the officers of cruisers that have been lawfully commissioned by a nation at war, but ships cannot be detained or boarded by the public ships of another power in the time of general peace, since such an act is an intrusion upon the rights of the State whose ships are so visited. However, in the time of war the general consent of nations yields to the belligerent the privilege of searching the ships professing to be neutral. This is quite necessary in order to have it known whether the neutral flag masks an enemy or covers contraband of war. Both persons and goods found concealed unlawfully may be captured. The War of 1812 was caused partly by England insisting upon the right of search.

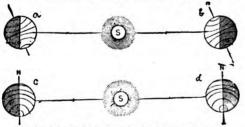
SEARS (sērz), Barnas, educator, born at Sandisfield, Mass., Nov. 19, 1802; died July 6, 1880. He graduated at Brown University in 1825 and subsequently studied at Newton Theological Seminary. In 1830 he was made pastor of a Baptist Church at Hartford, Conn., and subsequently studied in the German universities of Berlin and Leipsic. He was made professor of theology at Newton Theological Seminary, of which he subsequently became president. In 1848 he was appointed secretary of the Massachusetts Board of Education, succeeding Horace Mann, but resigned to become president of Brown University in 1855. After serving efficiently for twelve years, he became general agent of the Peabody Educational Fund. He was editor of the Christian Review for several years. He published "The Life of Luther" and edited Nöhden's "German Grammar."

SEA SERPENT, the name of a monster supposed by some writers to exist in the sea. It has been described in the literature of many countries, but such an animal has never been

captured and its existence is purely mythical. Such a monster was first mentioned in Norse literature, in which it is described as being 200 feet long and 20 feet in circumference. Paul Egede, while on a voyage from Norway to Greenland, in 1734, claimed to have seen a living sea serpent. Since then numerous reports have been published. A. C. Oudemans, an English writer, in 1892, published an account of the various appearances of the sea serpent in a work entitled "The Great Sea Serpent." While a few scientific men are inclined to believe that some marine reptile like the plesiosaurus is in existence, the large majority give no credence to the suggestion. It is probable that floating logs, schools of porpoises, the ribbon fish, or collections of seaweed are the source of this mythical animal.

SEASICKNESS, a nervous affection due to the motion of ships at sea. The early symptoms are headache and nausea, which are followed by vomiting and general weakness. While oscillations and movements to which persons are not accustomed are known to be the general causes, the exact origin and nature are not perfectly understood. Frequently it attacks the strong and cautious, while the weak and careless are unaffected. Usually it passes away in a few hours, but sometimes continues several days or during the entire voyage. Persons in middle life are subject to the more severe attacks, while children and aged persons are less liable to the malady. Soda water, calomel, and bromide of potash are sometimes prescribed, while others escape by lying down when they feel uncomfortable. See Gyroscope.

SEASON, the division of the year as determined by the position of the earth with respect to the sun and as marked by a particular state of moisture, temperature, vegetation, and



SEASONS IN THE NORTH TEMPERATE ZONE.

a. Winter,
c. Spring,
b, Summer,
d, Fall.

difference in the length of day and night. The rays of the sun shine directly on the Equator on the 21st of March, and fall directly on localities farther north until the 21st of June, when the sun is directly over the Tropic of Cancer. It begins to move southward on the latter date, shining directly on the Equator on the 22d of September, but continues the movement southward until the 21st of December, when it shines directly on the Tropic of Capricorn and thence

again moves northward. The effect is that four seasons occur in the Temperate zones, namely, spring, summer, autumn and winter. Only two seasons occur in the tropics, the wet and the dry, this being due to an almost uniform temperature throughout the year and to the fact that rain follows the sun. This results in a wet season succeeded by a dry season at the tropics, while in the vicinity of the Equator there are two wet seasons and two dry seasons each year, this being due to the circumstance that the sun crosses the Equator twice each year. In effect there are but two seasons in the Arctic and Antarctic regions, a long, cold winter and a short, dry summer. The four distinct seasons are found only in the middle portions of the Temperate zones. They are modified noticeably by proximity to the sea and elevation above sea level.

In speaking of the seasons from an astronomical standpoint, it may be said that spring extends from the vernal equinox, when the sun enters Aries, to the summer solstice; summer, from the summer solstice to the autumnal equinox; autumn, from the autumnal equinox to the winter solstice; and winter, from the winter solstice to the vernal equinox. However, this is true only of the North Temperate Zone, since the seasons are reversed in the Southern Hemisphere. The greatest summer heat is not reached on June 21, when the days are longest, for the reason that as the rays of the sun shine more nearly vertical on the earth's surface a quantity of heat is stored, and, when this is united with the heat received at the time the days begin to decline in length, the temperature gradually rises until the sun's rays fall quite obliquely on the surface. In the same way the coldest days do not occur near Dec. 21, when the days are shortest, but some time thereafter, when practically all the latent heat stored in the surface during the summer has radiated. It will be observed that the warmest part of the day is shortly after noon and the coldest part of the night in the morning, this being due to the same cause.

SEA SQUIRT, the name applied to several species of Ascidians, owing to their habit of squirting jets of water when irritated. The young resemble a tadpole, and the adult is constituted of leathery or gristly tissues. These animals are found in many places attached to shells and stones near the shores of the sea. They are mollusks of a low class.

SEATTLE (se-ăt't'l), the largest city in Washington, county seat of King County, on Elliot Bay, an inlet from Puget Sound. It is 28 miles north of Tacoma, 345 miles west of Spokane, and 125 miles inland from the Pacific Ocean. The city occupies a fine site between Puget Sound on the west and Lake Washington on the east, the area included within the limits being about thirty square miles. The ground rises gradually from the waters of Puget Sound,

but in some places has elevations of 300 feet, and the higher altitudes are separated by beautiful valleys or terraces. Along the waterfront is a narrow tract, peculiarly suited for docks, wharves, and railway yards. The streets are regularly platted and the principal thoroughfares extend north and south. They are finely paved with stone, asphalt, vitrified brick, macadam, and wooden blocks.

DESCRIPTION. Seattle is beautified by numerous parks of great beauty. These include Lincoln, Denny, Woodland, Kennaer, Volunteer, Washington, and Ravenna, the last mentioned being a public ground in which the natural scenery is finely preserved. Extensive grounds are located at Fort Lawton and the State university. Brick and stone constitute the principal materials used in building, but in much of the newer buildings the steel frame has been utilized. Among the public structures are the county courthouse, the city hall, the Federal building, the Carnegie public library, the high school, and the buildings of the State university. It is the seat of the University of Washington, in which the educational system of the State culminates. Other institutions include several fine public school buildings, the Seattle Seminary, the Academy of the Holy Name, the College of the Immaculate Conception, and several private and denominational institutions. The public library, constructed by a gift of \$200,000 by Andrew Carnegie, contains 50,000 volumes. Hotel Washington, the Butler, the Seattle, and the Rainier are among the leading

INDUSTRIES. The city has transportation facilities by the Northern Pacific, the Great Northern, the Chicago, Milwaukee, and Saint Paul, and other railways. A network of electric lines furnish transportation to all parts of the city and branches extend to Tacoma and other cities of the State. The harbor is safe and extensive and is reached by the largest ocean steamers at all seasons of the year. Puget Sound is connected with Union and Washington lakes by a canal recently completed by the Federal government, hence additional landing and anchorage facilities are afforded by the valuable harbor on Lake Washington. The foreign trade has a value of \$60,500,000. It consists largely of exports to the markets of Asia. The products exported include lumber, coal, cotton, wheat, flour, gold and silver, cured and packed meats, fruits, and machinery. The city has an extensive wholesaling and jobbing trade and ships large quantities of lumber and shingles to eastern points.

Seattle has vast interests in manufacturing enterprises, whose products have an annual value of \$35,500,000. The principal establishments include flouring mills, lumber yards, slaughtering and meat-packing plants, machine shops, and shipyards. Among the general manufactures are confectionery, furniture, carriages, dairy

products, canned fish and fruits, clothing, and tobacco products. Vast power is derived from Snoqualmie Falls, on a river of the same name, about 25 miles southeast of the city. At Port Orchard, about fourteen miles from Seattle, is the Puget Sound Naval Station. The streets are well lighted with gas and electricity and it has extensive systems of waterworks and sewerage, both of which are owned and controlled by the municipality.

HISTORY. The first settlement on the site of Seattle was established in 1852 and it was named from an Indian chief. It was platted the following year, but remained a village until 1880, when it was chartered as a city. At an early date it became prominent as a commercial center for the Puget Sound region, and its prosperity was greatly augmented by the discovery of gold in Alaska. A great fire swept over the business district in 1889, but it was soon rebuilt on a much more substantial plan. The building of railroads and the establishment of steamboat lines made it a commercial rival of San Francisco, and since then its increase in wealth and population has been continuous. In 1909 it was the seat of the Alaska-Yukon Exposition. Population, 1900, 80,671; in 1910, 237,194.

SEA URCHIN, the name of a genus of marine animals, belonging to the class Echi-These animals are widely distributed in the shallow waters and along the coasts of the sea. The body is anchored to the bottom, or to rocks, and is studded with movable spines. While living, the shell and spines are quite flexible, but they become hard when dried and the shell assumes a more or less globular form. If undisturbed in the water, they expand the upper extremity, but it is drawn together rapidly when touched or irritated. They propagate by small eggs. The young swim freely while in the larval stage, but pass through complicated phases of development. Large numbers are found on the coasts of the Pacific, especially where the sea covers the surface during high tides, and when the water is low or has flowed entirely away they are preyed upon by crows and other birds. Some large species, as those of the Mediterranean, are gathered as an article of food.

SEBASTIAN (se-bas'chan), Don, King of Portugal, born in Lisbon in 1554; died August 4, 1578. He succeeded his grandfather, John III., in 1557 under a regency. At an early age he gave evidence of great fondness for the sciences and military conquests. In 1574 he conducted an expedition against Tangier, Morocco, and made a second invasion of that country four years later. In the Battle of Elcazar he and a large part of his army were slain. Portugal now became a prey to anarchy and was soon annexed by Philip II. of Spain. It became current among the people that their king was not slain and would return, and this gave rise to many impostors who pretended to be the true

Sebastian. Later a myth was developed, which ultimately gave rise to many poems and romances. It is still believed by many peasants that Sebastian will yet return to restore his

people to their ancient glory.

SEBASTIAN, Saint, noted Christian martyr, born in Narbonne, France, about the middle of the 3d century; suffered martyrdom Jan. 20, 288. He was educated at Milan and entered the Roman army as a captain of the Praetorian guard under Diocletian, though without revealing his religious views. It thus became possible for him to protect the persecuted Christians and to convert the keeper of the prison to Christianity. Later he publicly confessed his faith. Diocletian made a strenuous effort to induce him to renounce the Christian creed, and, finding the task useless, had him condemned to be executed. The archers who were commissioned to execute him left him as dead, but a Christian lady named Irene found that life was not extinct and restored him to health by careful nursing. Soon after recovery, Sebastian again appeared before Diocletian to confess his faith, but the latter ordered that he be beaten to death in the amphitheater and his body to be thrown into the sewer. The Greeks hold his festival on the 20th of December. He has been made the subject of many fine paintings by Italian masters, including Veronese, Mantegna, and Domenichino.

SEBASTOPOL (sē-bas'to-pol), or Sevastopol, a seaport city of Russia, on the Black Sea, in the government of Taurida. It is in the southwestern part of the Crimea and has important railroad connections with Eurasian cities. It has a secure and commodious harbor. Sebastopol is the seat of a large interior and foreign trade, particularly in grain, hides, salt, and manufactures. It is strongly fortified. The harbor is sheltered on the north and south by lofty limestone ridges, and there are ample facilities for the largest vessels to anchor safely on the shore. The allied armies of Turks, French, and English conducted a memorable siege in the Crimean War of 1854-55, and the first bombardment took place on Oct. 17 of the former year. General Todleben defended the land side against the French and English for eleven months, but on Sept. 8, 1855, the Russian evacuation occurred. Population, 1912, 63,240,

SECESSION (se-sesh'un). See Civil War. SECONDARY SCHOOLS, the name given to institutions of learning that are classed between the common schools and the colleges. These schools are intended to prepare pupils for entrance into the institutions of higher learning. The list of these schools in Canada and the United States includes academies, seminaries, and public high schools, and in many cases their courses are such that pupils who graduate from them are entered without examination into colleges and universities. In the United States the high schools are under township or city con-

trol, and the academies and seminaries are either managed as private or denominational institutions. Besides college preparatory courses, they usually maintain departments of music, commerce, and manual training. Secondary schools are known in Germany as Realschulen and in France as Lycées.

SECORD, Laura, heroine, born in Massachusetts in 1775; died Oct. 17, 1868. She was the eldest daughter of Major Thomas Ingersoll, a British loyalist, and in 1795 removed to Canada, where she married James Secord. In 1813 she saved the British force at Beaver Dam under James Fitzgibbon, from defeat by a larger force of Americans, which she did by walking from Queenstown to warn her countrymen, and the 500 Americans who made the attack were compelled to surrender. A monument was erected to her honor at Lundy's Lane.

SECRETARY BIRD (sĕk'rē-tā-ry), a genus of rapacious birds native to Africa and the Philippine Islands. They are so named from



SECRETARY BIRD.

the fanciful resemblance between the crest, made up of a peculiar plume of long feathers, and pens projecting behind the ears of a clerk. The species native to South Africa is typical and is the best known. The head and neck are long, the height when standing is about four feet, the color is grayish-blue, and the tail is very long. The wings and legs are long. It can fly with facility when it is in the air, but greatly prefers to run. The natives and Europeans of South Africa protect it for its service in killing serpents, on which it feeds. It kills the serpents by inflicting severe injury with its feet and beak, or by dropping them from a high elevation while on the wing. Though sometimes bitten by venomous serpents, it appears to be entirely fearless. Secretary birds

may be domesticated, in which state they serve

to protect poultry.

SECRETION (se-kre'shun), the process by which certain matters are separated from others in an organized body and collected at particular places to be employed for special purposes in the system, as the saliva, bile, gastric juice, and mucus. Secretion is performed in animals by organs of various form and structure, but generally by glandular epithelial cells. It appears that neither the form nor internal arrangement of the parts of a gland have any essential connection with the nature of the fluid secreted, the process of secretion being always performed by the intervention of cells, whose office is to elaborate from the blood substances different than the blood. Certain secretions are to be thrown off the system as useless or injurious, as the urine, which are generally called excretions. The process of secretion is carried on under stimuli of the system, but it is materially enhanced or suppressed by mental conditions. Secretion of plants is the process of separating certain elements from the sap and elaborating them for particular uses. They are produced in the interior of the plants and are made up largely of those known as nutritious secretions, including sugar, starch, albumen, gum, gluten, and lignin. The special or non-assimilable secretions in plants include coloring matters, alkalies, acids, resinous principles, milks, and many others

SECRET SERVICE, the department of government which is concerned in the detection of crime and fraud, or to collect information of a private nature for the benefit of a state or nation. In some countries the secret service is a distinct department of the government, and the subordinates transmit reports from time to time either direct or through heads of departments to the chief official in this branch of the service. While valuable services are rendered in discovering those who are disloyal or in breaking up unlawful organizations, the chief purpose is to detect counterfeiters of coins and paper currency and to coöperate in enforcing the revenue laws. Smuggling is another form of crime coming under the attention of the secret service.

SECULAR GAMES (sěk'ů-ler), the name of a class of performances popular in ancient Rome, so named from a saeculum, meaning a generation or the extreme duration of human life. Originally these games took place at short intervals, but it was decreed in 249 B. c. that they should be celebrated every 100th year, and Augustus extended the period to 110 years. The purpose was to celebrate in a fitting manner the close of a period during which all who live at the beginning had passed away. Three days were usually given to the games, and it was a part of the festivities to offer animals as sacrifices to Proserpina and Dis Pater, the Greek gods of the lower world. The last celebration

took place in 204 A. D., in the time of Septimius Severus.

SEDALIA (sē-dā'lī-a), a city of Missouri, county seat of Pettis County, 88 miles southeast of Kansas City, on the Missouri Pacific and the Missouri, Kansas and Texas railroads. It is surrounded by a fertile farming country, which produces cereals, fruits, and grasses. The noteworthy buildings include the county courthouse, the high school, the public library, the Convent of the Sisters of Saint Joseph, the hospital of the Missouri, Kansas and Texas Railroad, and the George R. Smith College. It has Forest and Liberty parks. Among the manufactures are flour, machinery, farming implements, hardware, railway cars, woolen goods, furniture, and boilers. It is improved with electric and gas lighting, public waterworks, substantial pavements, and a sewerage system. Sedalia was founded by Gen. George R. Smith in 1861, was captured by the Confederates in 1864, and was chartered as a city in 1889. Population, 1900,

15,231; in 1910, 17,822.

SEDAN (se-dăn'), a city and fortress of France, in the department of Ardennes, 64 miles northeast of Rheims. It occupies an imposing site on the Meuse River and in its vicinity are extensive deposits of coal and iron. The manufactures include cotton and woolen goods, metal ware, pottery, and laces. Sedan is noted as a military and strategic point. It surrendered to the Germans in 1815 and also on Sept. 2, 1870. In the latter year it was occupied by a French army of 86,000 under Napoleon III. and Marshal MacMahon. The German army under King William laid siege to the city and on Sept. 1 began a vigorous attack, which resulted in the surrender on the following day. Napoleon was sent as a prisoner of war to Wilhelmshöhe, and the republic of France was declared at Paris by Gambetta on Sept. 4. It was again occupied by the Germans in 1914 after an extended attack. The Sedan chair, a portable covered vehicle for carrying a single person, borne on two poles by two men, was invented in and so named from the city of Sedan. The city now has excellent railway facilities. Population, 1916, 20,408.

SEDATIVES (sed'a-tivz), the name applied to any drugs which have a soothing or quieting effect upon the sensory function, either local or general. Drugs that have a local effect act upon different organs, while those included with the general sedatives influence the entire system. Some drugs are sedatives in their effect upon one or more particular organs, but may influence others as irritants. In some cases these drugs are sedative in small doses, but excite or irritate when taken in large quantities. Ether and chloroform are general sedatives, while opium, aconite, and cocaine are classed as local sedatives. Potassium and sodium soothe the nerves and spinal centers; bismuth and sodium bicarbonate, the stomach; and aconite and digi-

talis, the circulatory system.

SEDGE (sěj), the common name of an extensive genus of plants, found mostly in swamps and wet places. They are generally distributed in all the temperate and northern parts of the earth. The stems are without joints, usually triangular, and possess little economic value. This genus of plants embraces the bulrushes and the sedges proper, the latter being species of the genus *Carex*. A species of allied plants was used by the ancient Egyptians in making papyrus paper. The coarse fodder derived from the sedge plant is of no particular value for domestic animals, since only a few species eat it and even those partake of it reluctantly.

SEDGWICK (sēj'wīk), Catherine Maria, author, born at Stockbridge, Mass., Dec. 28, 1789; died July 31, 1867. She opened a private school for young ladies in 1813, in which she remained a constant worker for fifty years. Her first publication, "A New England Tale," was published in 1822 with the aid of her brother, Theodore Sedgwick. Subsequently she gave her attention largely to literary work. A number of her writings were translated into the leading languages of Europe, including "Redwood," of which many editions were issued. Other books include "Live and Let Live," "Facts and Fancies," "The Linwoods," "Letters to My Pupils," and "Letters from Abroad."

SEDGWICK, John, soldier, born in Cornwall, Conn., Sept. 13, 1813; slain in battle May 9, 1864. He graduated from the West Point Military Academy, in 1837, and soon after served against the Seminoles in Florida. His services were volunteered at the beginning of the Mexican War, in which he rendered valuable aid at Cerro Gordo, Contreras, Churubusco, and Chapultepec. In 1861 he was commissioned brigadier general of volunteers and was assigned to the army of the Potomac. His efficient services in the Battle of Fair Oaks won the day for the Union army, and soon after he bore a conspicuous part at Antietam. He was promoted major general of volunteers in 1862 and fought at Fredericksburg, Chancellorsville, Gettysburg, Rappahannock, and in the Wilderness campaign. His death resulted from a bullet fired by a Confederate sharpshooter while placing guns in the intrenchments at Spottsylvania Courthouse. In 1868 a fine bronze statue was erected at the West Point Military Academy to commemorate him.

SEED, the body produced by the ripened pistils of plants, from which a new plant may spring. It is an ovule fertilized and matured, and has a germ or embryo formed in it. Upon reaching this perfected state, it is separated from the parent plant, and in it are contained all the necessary elements to bring forth a new life similar to the one on which it grew and of which it was a part. It consists of two parts, the nucleus, or kernel, and the integuments, or coats. An outer loose covering, generally an imperfect one, is on many plants while the seed

is growing, this being called an aril. The seed coats proper are commonly two, an outer and an inner; the latter generally is thin and delicate. The outer coat is called the testa and the inner is the tegmen, or endopleura, and the two are known as the spermoderm. In some plants the outer coat is close and even, as in the morningglory, sometimes it has a tuft of long hairs, as in the milkweed, while in others it is covered with long, woolly hairs, as in the cotton plant, which forms the useful cotton of the market. Some seeds have a fringelike wing or tuft at each end, as the catalpa seeds, while the seeds of maples are winged at one end. These tufts and wings are designed to render such seeds buoyant, so they may be dispersed by the wind when ripe. In some plants the seed is borne on a seedstalk. The scar, or hilum, is the mark where the seed was attached to the plant, this being particularly plain in the bean, pea, chestnut, and buckeye.

forms the kernel. It consists of the embryo and the albumen, though in some plants the latter is wanting. Seed albumen is a stock of prepared food, which is designed to support the embryo in the early stage of growth, but in some seeds a similar supply is laid up in its cotyledons. The embryo is a plantlet in miniature. The development of the embryo depends upon the seed, fruit, and blossom. It is nourished by the albumen of the seed until it secures sufficient vigor to provide for itself. It is protected by the seed coats. The embryo has the radicle or original stemlet, from one end of which the roots grow downward, and from the other the stem is pushed upward. It also sends forth one or more cotyledons or seed leaves, and often a plumule or bud for continuing the stem upward. Some seeds may be stored and kept a long time, while others begin growth soon

after coming in contact with moist soil. Wheat,

corn, rye, and other cereals begin to sprout im-

mediately after being placed in a moist and

warm soil, while the walnut is protected from

growth or early decay until the following spring.

The whole body of the seed within the coats

Some seeds require time to dissolve their outer covering before they give rise to a new plant, and in others it is necessary for the store of food to be acted on by the ferments lying within the covering. There is much difference in the length of time that seeds may be kept, even under the best of care. Such seeds as those of the poplar and willow must be brought to moist soil within a few days after ripening, while beans, rye, and wheat may be stored for many years. The seeds of plants supply man and animals with wholesome foods, the more important being wheat, rye, oats, corn, barley, buckwheat, coffee, linseed, mustard, nutmeg, cotton seed, rice, beans, peas, etc. Seeds having one cotyledon are called monocotyledonous; those having two, are termed dicotyledonous; and the seeds of flowerless or cryptogamic

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plants are designated acotyledonous. Cryptogams, or flowerless plants, reproduce by means of spores, which are analogous to the seeds of ordinary flowering plants, but they contain no embryo. They are mostly one-celled and gen-

erally produce extensively.

A steady and growing demand for seeds of farm grains, fruits, and vegetables has developed in America from the first settlement of the country. It was originally customary for farmers and others to preserve seed supplies from their own production, but later the demand for purer and better seeds sprang up, which caused the development of regular seed farms. first of these was established in 1784 by David Landreth, near Philadelphia. With the general development of the country and the growth of cities came a demand for better fruit and vegetables than were reared in the commonplace gardens. Many market gardeners were induced to grow seeds to supply the demand of those producing the materials for the city market. This ultimately led to the establishment of farms at which seed production is the principal object.

At present there are about 600 farms in the United States devoted exclusively to seed production. These utilize about 175,500 acres of land and represent a capital of \$20,500,000. Besides the regularly established farms, quite a large number of agriculturists produce seeds to supply local dealers or customers within the immediate neighborhood. The seed industry has been the means of a general improvement in the nature of the product and a diversification of the crops produced. The seeds grown in this way comprise practically all species of grasses, grains, fruits, and vegetables. Seed culture is carried on most extensively in New York, California, New Jersey, and Ohio. A demand for northern-grown seeds, especially those of a hardy class of plants, has caused the industry of seed culture to be established in many northern states, particularly in Minnesota, Wisconsin, and Michigan.

SEELAND. See Zealand.

SEELEY (se'li), John Robert, historian, born in London, England, in 1834; died Jan. 13, 1895. He studied in the city schools of London and Cambridge University, and after graduating at the latter became one of its fellows. In 1863 he was made professor of Latin in University College, London, and six years later became professor of modern history at Cambridge. He published, in 1865, a remarkable work entitled "Ecce Homo, or the Life and Work of Jesus Christ." It was followed, in 1882, by "Natural Religion," but this attracted much less attention than his first writ-Subsequently he became devoted almost exclusively to history, and besides many others published an elaborate history of the recent developments of the German Empire, entitled "Life and Times of Stein." He contributed to many European and American magazines. In 1894

he was knighted. Among his writings not named above are "Expansion of England," "History of Napoleon I.," "Goethe Reviewed after Sixty Years," "Roman Imperialism," and "Letters and Essays."

SEGUIN (så-găn'), Edouard Onesimus, physician, born at Clamecy, France, Jan. 20, 1812; died Oct. 28, 1880. He came to the United States in 1848 and soon after settled at Cleveland, Ohio, to practice medicine. Subsequently he became a teacher and trainer of idiot children at Syracuse, N. Y., and in 1879 established the Seguin Physiological School for feeble-minded children in New York City. His success in the treatment of idiots, both in France and the United States, gave him a wide reputation. He published a number of works on his favorite theme, including "Idiocy, and Its Treatment by the Physiological Methods."

SEIDL (zī'd'l), Anton, musical conductor, born in Pesth, Hungary, May 6, 1850; died in 1898. He studied music at Leipsic and Bayreuth under Richter and Wagner, and in 1876 became stage director at the first production of Wagner's Nibelungen drama at Bayreuth. In 1879 he became conductor at Leipsic, where he remained until 1882, and three years later was called to conduct the German opera in New York City, succeeding Leopold Damrosch. He succeeded Theodore Thomas as conductor of the Philharmonic Society in 1891. Subsequently he conducted musicales at Convent Garden, London, and in many other cities in Europe, including the Bayreuth Festival in 1897.

SEIDLITZ POWDERS (sěďlits), a medical preparation named from the saline springs in Seidlitz, a village of Bohemia, used as an agreeable and effective aperient. These powders consist of 35 grains of powdered tartaric acid, inclosed in white paper, and 40 grains of bicarbonate of soda and 120 grains of tartrate of soda and potash, in blue paper. The contents of the two papers are dissolved separately, each in a half tumbler of water, and the two are then poured together. Immediately an effervescence takes place, during which the mixture should be taken. Rochelle salt is a similar preparation and the two names are frequently interchanged.

SEINE (sān), a river of France, which rises in the department of Côte d'Or, a short distance northwest of Dijon, and after a course of 481 miles toward the northwest discharges into the English Channel. It flows through a highly fertile region and has a number of important tributaries, including the Oise, Marne, Aube, and Yonne rivers. Vast canals have been constructed to connect with the Seine making it the basis of a large interior and foreign trade. The improvements from its mouth to Paris are particularly extensive, while Rouen has been made a seaport by deepening its channel and constructing immense wharves. Among the principal cities on the Seine are Paris, Le Havre,

Rouen, Saint Germain, Melun, and Fontainebleau, thus making the river important next to the Thames and the Hudson. The basin has an area of 30,000 square miles. It is navigable for a distance of 350 miles from its mouth.

SEISMOGRAPH (sīs'mō-graf), or Seismometer, an instrument to indicate and record the motions on the surface of the earth during an earthquake. Various instruments are made for this purpose, including the seismoscope, which merely leaves a record of the tremor of the earth, either with or without indicating its time. However, the seismograph, or seismometer, records the direction, period, and extent of the shock. Most instruments of this class have an index, which is set in motion by the shock, thus tracing the horizontal and vertical movements on smoked glass or a similarly blackened surface. The newer instruments contain electrical mechanisms, which are set in motion by the movements, and are sufficiently sensitive to record exceedingly mild tremors. They not only indicate the vertical and the horizontal movements, but record each shock, the direction, the maximum intensity, and the duration of each movement. Instruments of this class are used in the observatory on Mount Vesuvius, Italy, and the Leland Stanford Junior University, California. SEJANUS. See Tiberius.

SELENE (se-le'ne), in Greek mythology, the daughter of Hyperion and Theia, sister of Helios and Eos, and worshiped as the goddess of the moon. Some writers identify her with Phoebe, the sun god, and in later times she was associated with Artemis. She is represented in statuary as driving across the heavens in a chariot to bring light to men. White horses or cows draw her chariot and in some instances her symbol, the crescent moon, is borne in a conspicuous place.

SELENIUM (se-le'nĭ-ŭm), a nonmetallic element classed immediately between sulphur and tellurium. It was discovered in Switzerland by Jöns Jakob Berzelius (1779-1848) in 1817. Selenium is a rare element, occurring in composition with other minerals, especially silver, gold, copper, bismuth, and lead, but small quantities have been found in a free state in Mexico. When oxidized and dissolved by nitric acid, it yields selenious acid. It is obtained as a darkbrown, vitreous and amorphous modification, or as a lead-gray crystalline mass, and is noteworthy for its variations as a nonconductor of electricity. The resistance to electricity is less in the light than in the dark, on account of which it has various uses in electrical contri-Tellurium is a vances and the photophone. nonmetallic element of the same group as selenium. It is of rare occurrence and is found either native or in combination with metals. The resistance to electricity is similar to but less marked than that of selenium.

SELEUCIA (se-lū'shī-à), the name of seven

cities in Asia, all of which were built in the early history of the dynasty of Seleucidae. Two of these were particularly famous, both for their commercial importance and political power. The earliest was Seleucia Pieria, founded by Seleucus Nicator in 300 B. C. It was situated near the mouth of the Orontes, twelve miles west of Antioch, of which it was the seaport. During the war between the Ptolemies and the Seleucidae for predominance in Syria it formed an important strategic point, but with the rise of Roman power it declined rapidly. The excellent port is still in a state of preservation, but the walls, temples, amphitheaters, and citadel are in ruin or entirely destroyed. The only connection between the city and the sea was a tunnel cut through the solid rock, having a length of 1,087 yards.

Seleucia-on-the-Tigris was the most celebrated of these cities, being for many years the eastern capital of the Seleucidae. It was founded by Seleucus Nicator about 35 miles northeast of Babylon and was built largely of material taken from the latter city, after that famous emporium had been ruined. Its growth was remarkable. In its greatest prosperity it had about 600,000 inhabitants and formed the most important commercial center of Asia even to the time of Strabo. When Western Asia was conquered by the Romans, it became the point of attack by the Persians, and was finally burned by Trajan in 116 A. D. At the time Emperor Julian made his expedition to the East he found the city entirely destroyed, and the country surrounding its ruins was the haunt of wild beasts.

SELEUCIDAE (se-lū'shĭ-da), the dynasty of kings that succeeded Alexander the Great in governing a large part of Western Asia. Their dominion included Syria, portions of Asia Minor, and the Eastern Provinces. The dynasty was founded by Seleucus Nicator (358-280 B. C.). who was a general under Alexander the Great, and after the death of the latter became satrap of Babylonia. A misunderstanding between him and Antigonus caused him to take refuge in Egypt in 316 B. c., where he secured assistance from Ptolemy, governor of Egypt, in taking the field against Antigonus, and he finally returned to his satrapy in 312 B. C. He conquered Media soon after and assumed the title of Seleucus I. in 306 B. C., thus founding the dynasty, and rapidly extended the borders of the kingdom from the Indus to the Oxus River. Four years later he formed an alliance with Ptolemy, Cassander, and Lysimachus against Antigonus, defeating the latter at Ipsus in 301 B. C., and in the general division of territory secured Syria and portions of Asia Minor, but with the death of Lysimachus, King of Thrace, he annexed all of Asia Minor.

Seleucus I. was assassinated in 280 B. C. by Ptolemy Ceraunus and was succeeded by his son, Antiochus I. This king sought to make the East Greek, as his father had endeavored to do before him, but was killed in a battle with the Gauls, who had invaded Asia Minor in 261 B. C. He was succeeded by a number of kings bearing the name of Antiochus, Seleucus, and Demetrius, but of these Antiochus III., surnamed The Great, was the most noted. He was the first to come into collision with the Romans, but was defeated by Acilius Glabrio at Thermopylae in 191 B. c. and soon after by From that time the power of the Seleucidae declined rapidly, being weakened by a loss of the kingdoms of Bactria, Armenia, Parthia, and Judaea, and the last small remnant was made a Roman province by Cneius Pompeius in 65 B. C.

SELIM I. (se'lim), Sultan of Turkey, son of Bajazet II., born in 1467; died Sept. 22, 1520. He was of a warlike disposition and secured the support of the Janizaries, with whose aid he dethroned his father and became monarch on April 25, 1512. It was his policy to remove every possible obstacle that might rise against his power and with that end caused the death of his father, brothers, nephews, and many others who might possibly aspire to the throne. He declared war against Persia in 1514. In

Ismail at Chalderon, annexed Kurdistan and Diarbekir to his dominion. He left a part of his army in Asia and invaded Egypt, where he defeated the forces of the Mamelukes.

the same year he invaded that country with an

army of 250,000 men and, after defeating Shah

The victorious army of Selim I. entered Cairo in 1517, where his chief opponents were put to death, and Egypt became incorporated with the Ottoman Empire. The last descendant of the Abasside caliphs of Egypt bestowed upon him the title of Iman and the standard of the prophet, and in consequence the Ottoman Sultan of Constantinople became the chief of Islam, as the legal representative of Mohammed. This distinction was soon after recognized by the sacred cities of Medina and Mecca, and his supremacy was acknowledged by the leading Persian chiefs. Though a fierce and cruel warrior, Selim was noted as a patron of literature and art. During his reign a powerful navy was built, the Janizaries were controlled, and the dominion was extended more than during the reign of any of his illustrious predecessors. He was succeeded by Solyman I.

SELIM III., Sultan of Turkey, son of Mustapha III., born Dec. 14, 1761; died in 1808. He succeeded to the throne after the death of his uncle Abdul-Hamid, in 1789, and immediately adopted a policy favorable to improvement, but his plans were disturbed by wars with Russia and Austria in Europe and with the French in Egypt. Austria compelled him to cede Choczim in 1791, and Russia obtained all his possessions beyond the Dniester by the Peace of Jassy in 1792. His progressive plans for clothing, arming, and disciplining his troops in the European fashion caused the dervishes to openly preach revolt, charging Selim with despising the holy injunctions of the Koran, and he was finally deposed by the Janizaries in 1807. In his reign many factories were established and internal improvements were fostered, but an organized attempt to reinstate him on the throne in 1808 was the immediate cause of his being assassinated.

SELINUS, an ancient city on the southwestern coast of Sicily, founded by a colony of Greeks about 630 B. C. The Athenians sent an expedition to Selinus in 415 B. C., owing to wars with people native to the island. An army of Carthaginians intervened in behalf of the native people in 409 B. C., when a large number of inhabitants were killed or carried away as slaves. In the First Punic War, about 250 B. C., the city was entirely destroyed and was never rebuilt. Ruins of large Greek temples are still extant, including one about 370 feet long and 177 feet wide. This structure was consecrated to Apollo and contained many sculptures. Several fine specimens of the latter are now in the museums of Palermo.

SELJUKS (sěl'jūks), o: Seljooks, the name of several Turkish dynasties, which descended from one family and governed large parts of Asia from the 11th to the 13th centuries. The dynasty was so named from Seljuk, a chief of a small tribe of Bokhara and the surrounding country, in the early part of the 11th century. His grandson, Togrul Beg, became the chief of a tribe that had migrated to northern Khorasan and established his government at Nishapur. He subdued Balkh and Khaurezm in 1041 and Bagdad in 1055, and became the reigning monarch at the last mentioned city. Togrul Beg was a warm supporter of the Moslem faith, which caused him to build numerous mosques and support pious and learned men. He was succeeded by his nephew, Alp Arslan, in 1063, as ruler of Persia, who soon after conquered Palestine and Syria from the caliphs of Egypt and in 1071 made Diogenes, Emperor of Byzantine, a prisoner. As a ransom for Diogenes, he received a large part of Asia Minor.

Alp Arslan was succeeded by his son, Melek Shah (1073-1093), who is noted as the most powerful of the Seljuk monarchs. He not only solidified the empire, but annexed all of Asia Minor and Arabia, thus governing the extensive region lying between Chinese Tartary and the Hellespont. His reign was aided by the influence of his grand vizier, Nizam-ul-Mulk, who is noted for his progressive scholarship and friendship for learning. Many bridges, canals, highways, hospitals, and colleges at Herat, Bassora, Ispahan, and Bagdad attest the progressive spirit of that epoch. Smaller kingdoms began to form after the death of Melek Shah, the foundation for which had been laid by that ruler, since he established a number of principalities that were professedly subject to the center state 2583

of Iran or Bagdad. Saladin was one of the Seljuk chiefs and as such came in contact with the Crusaders. Others like him began to assert their power until finally the monarchy became dissolved. The Mongols under Genghis Khan pressed the Mohammedans toward the west and their dominion at length fell entirely, the Seljuk dynasty ending with Kaikobad in 1315. The Ottoman princes succeeded the Seljuks, both of whom were Turks, and thus the foundation for the Turkish or Ottoman Empire was laid.

SELKIRK (sěľkěrk), Alexander, the prototype of Robinson Crusoe, born in Largo, Scotland, in 1676; died in 1723. He was the son of a shoemaker and tanner, whose name was Selcraig, and at an early age left home to engage in a seafaring life. In 1703 he became engaged as a buccaneer in the South Seas, and, being of a quarrelsome disposition, disagreed with his captain. In October of the same year he was put on the island of Juan Fernandez, where he remained a solitary resident for four years and four months, when he was rescued by Capt. Woodes Rogers, who made him commander of a privateering vessel. He returned to Scotland in 1712, but again went to sea, rising to the rank of lieutenant in the navy. A statue has been erected to his memory in his native town. Daniel Defoe made the experiences of Selkirk prominent in his "Robinson Crusoe," which he published in 1719, but this famous book contains many experiences drawn from imagination. See Juan Fernandez.

SELKIRK MOUNTAINS, an elevated mountain range in southeastern British Columbia. It belongs to the Rocky Mountains. The range is about 175 miles long by 80 miles wide, and lies immediately west of the Rocky Mountains proper. Mount Sir Donald, height 9,945 feet, is the culminating peak. The Canadian Pacific Railway crosses the range through Roger's Pass, at an altitude of 4,300 feet. It has an abundance of valuable timber to a height of nearly 6,000 feet, but snow lies perpetually on the elevations exceeding 7,000 feet. The presence of vast snow deposits gives rise to large glaciers, which in former times were even more extensive than at present, a fact evidenced

by numerous moraines.

SELMA (sěl'mà), a city in Alabama, county seat of Dallas County, on the Alabama River, 48 miles west of Montgomery. It has navigation facilities and is on the Louisville and Nashville, the Southern, the Western of Alabama, and other railroads. The place is well platted and handsomely built and in the surrounding country are rich cotton, lumber, coal, and iron productions. Among the manufactures are cotton-seed oil, ice, cotton batting, lumber products, car wheels, cigars, fertilizer, machinery, and clothing. The principal buildings include the county courthouse, the public library, the Y. M. C. A., the Dallas Academy, the high school, and the Alabama Baptist Colored University. It has public waterworks, sanitary sewerage, and substantial street pavements. The place was settled in 1823. Population, 1900, 8,713; in 1910, 13,649.

SELOUS (se-100'), Frederick Courteney, explorer, born in London, England, Dec. 31, 1851. He studied at Rugby and in Germany, and in 1871 went upon an exploring expedition to South Africa. For nearly twenty years he traveled in Matabeleland and the south central part of Africa, where he hunted elephants and made a collection in natural history. He participated in the first Matabele War, in 1893. Subsequently he visited England, but returned to Africa at the time of the rinderpest in Matabeleland. His books include "Sunshine and Storm in Rhodesia," "Sport and Travel, East and West," and "A Hunter's Wanderings in Africa."

SELVAS, the name applied to the forest regions of South America, especially to the timbered plains of the Amazon basin. located in a vast extent of country where rainfall is abundant, and are characterized by many climbing plants and a great variety of trees of large size. India rubber, lumber, and medicinal barks are obtainable in large quantities, but the greater part of these forests have not been utilized and are still in a primeval condition. The region as a whole may be said to contain some of the largest and most valuable forests in the world.

SELWYN (sĕl'wĭn), Alfred Richard Cecil, geologist, born at Kilmington, England, July 28, 1824; died in 1904. He studied under private tutors in England and Switzerland and entered the British survey service in 1845. In 1852 he was made director of the geological survey in Victoria, Australia, and subsequently explored the coal and gold fields of Tasmania and South Australia. He became director of the Canada geological survey in 1869, which post he held until 1895. The following year he was made president of the Royal Society of Canada. Besides contributing to numerous periodicals, he wrote the Canadian part of Sanford's "Compendium of Geography and Travel."

SEMAPHORE (sem'a-for), an apparatus for giving signals by lanterns, flags, and oscillating arms. Signals of this kind were formerly very common in the military organizations as well as on railroads, but they have been superseded largely by the use of electrical communication. Railways still employ semaphore signals of various kinds. They consist of posts from ten to twenty feet in height, at the top of which are two forms of arms, one being notched and the other square-ended. The latter are painted red on the side toward the trains they signal and white on the other side, and at night red or white lights are used for the same purpose. In most cases the red signal indicates danger, hence the engineer is cautioned to stop or run slowly. The white signal, or light, indicates that the train is to proceed without stopping.

In some cases the arm is dropped to indicate a clear track, is raised to an angle of 45° to signify caution, and is elevated to a horizontal position as a signal that the train is to stop.

SEMBRICH (zem'brik), Marcella, operatic singer, born in Lemberg, Austria, Feb. 15, 1858. She descended from parents native to Galicia and her real name was Marcelline Kochanska. For some time she studied under Liszt in Vienna, but later found that she was better adapted to soprano singing than to play on the piano. In 1877 she made her début in Athens, Greece, and soon after appeared successfully in Vienna and Dresden. She sang successfully in the leading cities of Europe a number of years and several times visited America. She attained her greatest successes in the characters of Lucia, Constance, Martha, Susanna, and Zulina.

SEMELE (sem'e-le), in Greek legends, a beautiful princess, the daughter of Cadmus, King of Phoenicia. She became noted because of the affection bestowed upon her by Zeus. Hera, the haughty queen of heaven, was jealous of her, and artfully persuaded her to insist upon Zeus visiting her in all his power and glory, well knowing that this would cause her instant death. When asked to grant a request, Zeus vowed by the Styx that he would accede to her wishes whatever they might be. Semele begged of Zeus to appear to her in all the glory of his divine power and majesty, and, having vowed to do so, he was compelled to grant her wish, but she was immediately consumed in the flames of the lightning. However, her son by Zeus, who was called Dionysus, was saved and became the god of wine.

SEMINOLES (sem'i-nolz), an Indian nation of Florida, which was composed chiefly of Creeks, from whom they separated in 1750. They aided the British in the War of 1812 and subsequently gathered other Indians and Negroes until, in 1818, they numbered about 4,000. Their invasions of Georgia and the destruction of property and life caused the government to send Gen. Andrew Jackson against them in 1818, who, after defeating them and destroying a number of their towns, captured Ambrister and Arbuthnot, two English adventurers, who were summarily hanged for inciting trouble with the Indians and the Spanish.

The annexation of Florida to the United States, in 1819, caused many Negroes to join the Seminoles, and war ensued, when the government decided to remove them to the West. A treaty in 1823 resulted in ceding most of their lands and, in 1832, the chiefs agreed that the tribe should be removed west of the Mississippi. Osceola stubbornly resisted removal and became the leader in a destructive war that lasted seven years, from 1835 to 1842. He was captured treacherously in the latter year. In 1845 a treaty was concluded by which the Seminoles were removed west of the Mississippi, and in 1856 lands lying west of the region occupied by

the Creeks were assigned to them. The Seminoles number about 3,000 and include many industrious farmers, manufacturers, and professional men. They support a large number of churches, mostly Presbyterian, and are devoted to schools and learning.

SEMIRAMIS (sē-mĭr'à-mĭs), the Queen of Assyria and Babylonia, reputed one of the most powerful rulers of Asia. Tradition makes her a daughter of Derceto, the fish goddess of Ascalon, and of a Syrian youth. She was exposed to death by her mother, but was fed by doves and afterward found and adopted by the chief of the royal shepherds. Omnes, governor of Nineveh, was attracted by her beauty and made her his wife, but she won the love of King Ninus by a heroic exploit, the capture of Bactria, which had defied the forces of the king. Omnes hanged himself to give Semiramis freedom to become the wife of Ninus, but that ruler died soon and she was proclaimed Queen of Assyria, ruling over that mighty empire for 42 years. She traveled in all parts of her dominion, founded Babylon, and made it the most powerful city in the world. In her reign stupendous monuments were built, highways were opened, canals were constructed, and large regions were added to the empire, particularly Libya, Persia, and Ethiopia. The dates of her birth and death are extremely doubtful, being assigned by most writers between the years 2182 and 800 B. c. The Hanging Gardens of Babylon are attributed to her time, and there are other antiquities that give evidence of her long and successful reign. She was succeeded by her son, Ninyas. According to tradition, she disappeared after assuming the form of a dove and was long worshiped as a deity.

SEMITES (sem'īts), the name of a group of nations. They are allied closely in physical features, language, and religion, and are regarded the descendants of Shem, a son of Noah. The peoples embraced in this group are distributed in many countries, but the region of their nativity is in Arabia, Syria, Chaldaea, Abyssinia, Phoenicia, Ethiopia, and Palestine. It is generally assumed that the first representatives were confined to Arabia about 4000 B. C., where they led a nomadic life, but later migrated into Mesopotamia. After dwelling for some time under the priest government of the Turanians then occupying that region, they became identified with the ruling classes, and finally spread over large parts of Western Asia and Northern Africa. The cities of Tyre and Sidon are among the many emporiums founded by Semites, and for centuries they were the predominating power of that region of the world. The language differs from the Aryan and the different Semitic nations have kept closer together and undergone less change than the

Aryan peoples.

Properly there are two divisions of the ancient dialects, one being generally known as the north-

ern and the other as the southern Semitic languages. The northern dialects comprise those spoken in ancient Assyria and Babylonia, together with the tongues of the Hebrews, Phoenicians, Carthaginians, Chaldaeans, Aramaians, and Syrians. They are nearly extinct as spoken tongues, Hebrew being the only one used at present in writing. To the southern Semitic tongue belong the Arabic, Amharic, Ethiopic, and Himyaritic. Ethiopic was anciently the language of Abyssinia, but it has given way to Amharic and other modern tongues. The Arabic language is used most extensively of the Semitic tongues and includes the four spoken dialects of Egypt, Barbary, Arabia, and Syria. Among the marked peculiarities of the Semitic languages is the triliterality of the roots, these consisting of three consonants, and the inflection by means of internal vowel change. It is peculiar for its absence of compound words.

The Semitic people are distinguished for their worship of one God. They are the early teachers of three religions which embrace the doctrine of one Deity; namely, the Jewish, Christian, and Mohammedan. Through them the Bible and the Koran were given to the world. They distinguished themselves in literature, arts, and many of the sciences. It was from Phoenicia that commerce and western colonization spread, while the powerful Carthaginian empire sent forth its Hannibal, and the Babylonians and Assyrians reared mighty empires and cities of great wealth. The Phoenician alphabet is not the oldest, but from it came most of the alphabets of Asia and Europe, while the system of notation in common use is from the Arabic. To them must be credited the preservation of learning while the Dark Ages spread their shadow over Europe, and their sacred books and cities

are still the attraction of thousands.

SEMMES (semz), Raphael, naval officer, born in Charles County, Maryland, Sept. 27, 1809; died Aug. 30, 1877. He studied law and entered the navy. Subsequently he took part in the Mexican War and from 1859 to 1861 served as secretary of the lighthouse board. He resigned that office at the beginning of the Civil War to enter the Confederate navy, when he became commander of the steamer Sumter. With it he captured eighteen merchantmen and sailed to Europe, but the steamer Tuscarora pursued and finally blockaded him at Tangier, Morocco. He sold his ship to evade capture and in 1863 returned to the United States in command of the famous Alabama, a steamer built and manned in England. With that vessel he captured 62 merchant vessels and destroyed the gunboat Hatteras off Galveston, but was pursued by the Kearsarge and his vessel was sunk off the harbor of Cherbourg, France, June 19, 1864. He escaped on a British vessel and returned to the United States, was soon after made rear admiral in the Confederate navy, and commanded the water approaches to Richmond.

In 1865 he joined General Johnston in the capitulation of Greensboro, N. C. Subsequent to the war he practiced law at Mobile, where he was arrested in 1865, but was released after several months' imprisonment. Afterward he became editor of a daily paper at Mobile and later was professor in the Louisiana Military Institute at New Orleans. The Alabama Claims originated from his naval career. He published "Campaign of General Scott in the Valley of Mexico,' "Memoir of Service Afloat During the War Between the States," and "The Cruise of the Alabama and the Sumter."

SEMPACH (zěm'päk), a town of Switzerland, in the canton of Lucerne, on the east shore of Lake Sempach. It has a population of 1,250 and would be of little more than local interest but for the decisive battle that occurred here on July 9, 1386, in which the Swiss gained a decisive victory over the Austrians. The Swiss army of 1,300 was under command of Arnold von Winkelried and the Austrian army of 5,400 was under Duke Leopold. The Swiss army made a desperate attack and totally defeated the Austrians, who lost 2,000 troops and 600 nobles, while the Swiss lost only 200 men. A chapel marks the site of the battlefield. The anniversary of this battle is still celebrated with im-

posing ceremonies in Switzerland.

SENATE (sěn'āt), the deliberative assembly of the Roman people. Originally it was composed of 100 members, each representing one of the decuriae into which the body of the Roman citizens was divided, at the time they comprehended the single tribe known as the Ramnenses. With these the Sabines were incorporated as a second tribe, hence an equal number of senators was added. When the third tribe, the Lucerenses, were added, the number was increased to 300. Subsequently the number varied greatly, exceeding 1,000 during the second triumvirate, but Augustus reduced it to 600. The senators held office for life. They were elected by the decuriae during the kingly period; by the consuls and consular tribunes, under the republic; and by the censors, after the establishment of the censorship. The plebeians as an order were never eligible, but they frequently attained to the senatorial dignity after the quaestorship and curule magistracies were opened to them. Hence the senate, originally a purely aristocratic body, became gradually the real representative of the people. The term is applied to the upper branch of the legislature in many states and countries, as in France, the United States, and some cantons of Switzerland. See Congress.

SENECA (sĕn'ē-kà), Lucius Annaeus, noted philosopher, born in Cordova, Spain, in the year 3 B. C.; died in 66 A. D. He was the son of Marcus Annaeus Seneca (61 B. C.-37 A. D.), a celebrated rhetorician, who taught rhetoric with success in Rome in the time of Augustus. Seneca the Philosopher, as the younger was

called, was taken to Rome at an early age, where he studied eloquence, philosophy, and law, but left the bar because Emperor Caligula threatened his life. He entered public life soon after, and in filling the office of quaestor rose to high favor with Emperor Claudius, but he was banished in 41 A. D. on a charge of intimacy with Julia, a niece of the emperor. In 49 he was called to the Roman capital, where he became praetor and afterward tutor to Emperor Nero, who, on ascending the throne, made him a consul in 57. It may be said that the influence of Seneca was highly potent in the bright years of Nero's reign, but when the emperor became tainted with crime and corruption he came to dislike his former tutor.

Seneca vainly petitioned the emperor to allow him to retire from office, offering at the same time to bestow upon him his large fortune, but the emperor had planned to cause his death. An attempt to poison him failed, but he soon after caused him to be charged with being implicated in the conspiracy of Pisa, and was condemned to put himself to death. Seneca chose to die by bleeding and accordingly cut several veins of his arms and legs. He is the author of many excellent works, among them treatises on "Anger," "Steadfastness of the Wise Man," "Providence," "Tranquility of Mind," and The last mentioned was addressed "Clemency." to Nero. Other writings include "Consolatio ad Helviam," a letter of consolation addressed to his mother; "Consolatio ad Polybium," a letter consoling Polybius on the loss of his brother; seven books on "Investigations of Nature;" seven books on "Benefits;" and eighteen books of moral letters. Many tragedies are attributed to him, all of which are remarkable for beauty of style, but they are inferior as productions for the stage.

SENECA FALLS, a village of New York, in Seneca County, on the Seneca River, ten miles northeast of Geneva. It is on the Seneca and Cayuga Canal and the Lehigh Valley and the New York Central railroads. The adjacent country is fertile, yielding grasses, fruits, and cereals. In the vicinity are picturesque lakes and deposits of gypsum and building stone. Among the chief buildings are the public library, the high school, the Johnson Home for Indigent Children, and the Mynderese Academy. The manufactures are machinery, flour, cotton and woolen goods, and lumber products. Electric railways furnish communication to Cayuga Lake Park and other points of interest. The place was settled in 1791 and incorporated in 1831. Population, 1900, 6,519; in 1910, 6,588.

SENECA LAKE, an elongated body of water in New York, lying between the counties of Seneca, Ontario, Schuyler, and Yates. The length is 35 miles; width, from one to four miles; and elevation, 247 feet above sea level. The greatest depth is 630 feet and its shores are picturesque and in many places quite abrupt. It is important for its fisheries and navigation facilities, being connected with the Erie Canal. The Seneca River issues from its northern end, which, with the Oswego River, carries the drainage to Lake Ontario.

SENECAS (sĕn'ē-kaz), an Indian tribe of the Iroquois family, formerly resident in western New York, where they became allied with Pontiac. They favored the English during the Revolution, but made peace with the Americans in 1784. In 1812 they joined the Americans, but a small part became allied to the hostile tribes of the west, though peace was concluded with them in 1815. This band was removed to Indian Territory, now Oklahoma, in 1831, but about 2,750 Senecas are still on reservations in New York.

SENEGAL (sen-e-gal'), a river of Western Africa, which rises on the northern slopes of the Kong Mountains, near the sources of the Niger, and after a course of about 1,000 miles flows into the Atlantic near Saint Louis. It receives an important tributary at Bafulabe, which is connected with Kayes by railway to overcome a number of falls, and from the latter town it is navigable to its mouth, a distance of nearly 700 miles. In its lower course are many branches leading from the main channel, forming numerous fertile islands, but materially lessening its importance for navigation by the larger vessels. A large portion of its basin has productive soil. Considerable timber occurs along its banks.

SENEGAL, a French colony in Western Africa, situated in Senegambia, comprising the coast region from a point somewhat north of Cape Verde to the British colony of Gambia. It includes the island and town of Saint Louis, at the mouth of the Senegal River, and a region extending inland from the coast equal to about 200,000 square miles. The population is estimated at 3,200,000. This region was first settled by the French in 1637, and is the base of operations politically and commercially for all of

Senegambia, which see.

SENEGAMBIA (sěn-é-găm'bĭ-à), an extensive colonial possession of France, in Western Africa, lying south of the Sahara, west of the Sudan, north of Guinea, and east of the Atlantic. It includes the colony of Senegal and a number of protected states, the whole comprising 415,800 square miles. French claims to this vast territory date from 1637, when they made settlements near the mouth of the Senegal River, and since then have been enlarging their sphere of influence 'oward the interior. Within recent years their claims have been extended to include the territory from the Mediterranean to the Gulf of Guinea, west of Tripoli and Lake Tchad, except only Morocco and Spanish territory on the west coast and portions of the coast from British Gambia to the Niger Territories. The portion of this region included in Senegambia is governed from Saint Louis, its local capital, where the governor general has his seat. He is assisted by a colonial council and is represented in Paris by a deputy. Saint Louis, Dakar, Kayes, Bakal, and Bafulabe are the principal trade centers.

The region lying along the Atlantic coast is generally low and swampy, the flat country extending inland from 100 to 200 miles. However, the surface rises from these low plains toward the east, terminating in mountain ranges that extend south of the Senegal River and between the headwaters of the Senegal and the Niger. The Kong Mountains are the most important highlands, rising to elevations about 3,500 feet above sea level, and between them and the coast regions is a lofty and more or less undulating plain. Thus, the region may be divided into Low, Middle, and High Senegambia, all being more or less important commercially. Senegambia is noted for its fertility of soil, and produces large quantities of cereals and fruits. Middle Senegambia is inhabited by numerous Negro tribes. It has a hot climate and a fertile soil and yields fruits, timber, and domestic animals. High Senegambia is inhabited largely by Moors, who are adherents of the Mohammedan faith. Many wild animals infest various parts of Senegambia, including antelopes, hippopotami, elephants, lions, panthers, leopards, hyenas, crocodiles, and monkeys. The climate of many sections is unhealthful for Europeans, particularly those lying near the marshy regions. Among the chief exports are yams, rice, maize, bananas, oranges, citrons, timber, and minerals.

The French are pushing vigorously the policy of introducing the rearing of domestic animals and the culture of many kinds of fruits, vegetables, and cereals. They are constructing railroads and improving the rivers by dredging and The more important streams are the Senegal, Gambia, Nunez, Niger, and Rio Grande, all of which are of more or less importance commercially. In their basins are vast forests of palm, mangrove, baobab, teak, and other tropical trees. The most important railroads include a line from Dakar to Rufisque and Saint Louis, and another from Kayes on the Senegal to Bammuku on the Niger. The latter connects the navigation of the two river systems. Moors and Negroes constitute the inhabitants, but the races are intermixed to some extent. Population, 1916, 2,608,600.

SENN, Nicholas, surgeon and traveler, born in Buchs, Switzerland, Oct. 31, 1844; died Jan. 2, 1908. He was brought to the United States by his parents in 1853 and for some time resided in Fond du Lac County, Wisconsin. In 1864 he graduated from the high school in Fond du Lac, taught in the public schools, and later studied medicine in Chicago. Subsequently he studied at the University of Munich, Germany, and practiced his profession in Fond du Lac and Milwaukee. In 1893 he removed to Chicago, where he became professor of surgery in the

Chicago College of Physicians and Surgeons. Later he was professor of practical and clinical surgery at Rush Medical College. He traveled extensively in both hemispheres and made several notable trips to the Arctic region. His books include "Intestinal Surgery," "Syllabus of Surgery," "Four Months Among the Surgeons of Europe," "Surgical Bacteriology," "Tuberculosis of the Bones and Joints," "Surgical Notes on the Spanish-American War," "Around the World via India," "Nurse's Guide for the Operating Room," and "In the Heart of the Arctics."

SENNA (sĕn'nà), the dried leaflets of several species of cassia, plants belonging to the bean family. These plants are native to Northern Africa, Western Asia, and Southern Europe, particularly to Arabia, Tripoli, and Egypt. Several allied species are native to the Eastern United States, where they are known as wild senna, and the leaflets are used as a mild cathartic. Senna has long been employed in Western Asia as an important medicine. Its use was



SENNA. Flower and Seeds.

introduced to Europe by Arabian physicians in the 9th century. The dried leaves are now a staple drug and yield medicinal properties useful in the treatment of numerous ailments, serving as a purgative and as a confection.

SENNACHERIB (sĕn-năk'ē-rīb), King of Assyria, son of Sargon, whom he succeeded on the throne in 705 B. C., and reigned until his death in 681 B. C. Among the notable events of his reign are the suppression of two revolts of Baylonia and successful wars against Ethiopia, Egypt, Armenia, Phoenicia, and Media. After a general invasion of Judah, he carried 200,000 Jews into captivity and required King Hezekiah revolted against this oppression the following year, which was the cause of a second invasion of Judah. After marching through Palestine, he besieged Libnah, where an angel of the Lord is said to have slain 185,000 of his

Assyrian warriors, and he was compelled to make a hasty retreat to Nineveh. His reign of 22 years was eminently successful and witnessed the building of many palaces, monuments, canals, and highways. His improvements are mentioned with equal favor in the Scriptures, by Josephus, and by the Greek historian Herodotus. The most elaborate palace was that at Koyunjik, which covered an area of eight acres and

contained many rare sculptures.

SENSATION (sen-sa'shun), a cognized affection of the nerves, or a modification of consciousness that results when some organ of sense is excited by external stimuli. The five organs of the senses, namely, the eye, the nose, the ear, the tongue, and the nerves that give rise to the sense of feeling or touch, are the end organs by which impressions are primarily received and thence transmitted to the brain. By means of these organs we become aware of light, sound, heat, mechanical pressure, color, scent, etc. Besides these some writers, as Professor Bain, add a sixth sense, that of muscular resistance. This sense is more than feeling, as in the case of lifting a weight one not only feels its surface, but experiences the sense of something resisting muscular effort. Perception by the senses is the basis of all our knowledge or mental activity. It is probable that a child deprived of all his senses would give no evidence of possessing a mind. The first mental act is attended or preceded by a cognition of impressions on the nerves; that is, the first thing one is conscious of is a sensation. The sense of touch or resistance is the most widely diffused, and the sensations arising from it are most readily perceived by animals. The others follow in the order named-sight, taste, hearing, and smell. See articles on the organs of the senses, Eye, Ear, etc.

SENSITIVE PLANT (sen'si-tiv), the common name of a shrubby plant of the bean family, which is native to tropical America. It attains a height of about one foot, has pinnate leaves, and bears small purple flowers in heads on long peduncles. This plant is remarkable for possessing a vegetable irritability, causing it to shrink from touch or disturbance. If a leaflet be touched, it folds rapidly, and if a branch is shaken, all the leaflets curl up and the branch bends toward the main stalk. In Panama it has been observed that a railroad train causes the leaves to fold when passing rapidly by a cluster of these plants. Several species possess the property of folding their leaves on the approach of night, and unfolding them at the return of These plants are cultivated quite

extensively in hothouses.

SEOUL (se-ool'), the capital of Corea, on the Han River, about 25 miles by road from the Yellow Sea. It is situated in a valley between mountains, and around its outskirts is a stone wall. Seoul has only two wide and improved streets, all the remainder being about twelve

feet wide and destitute of pavements and sidewalks. The architecture is mostly of wood, the buildings are covered with thatched roofs, and in the narrow streets are gutters for the escape of refuse matter, which is carried off by a shallow stream of water. The most important buildings include those of the government, which are situated within the city but are separated from the remainder by a secure wall. Manufactures are in a rude and very primitive state, the most important being clothing, mats, paper, tobacco, silk textiles, fans, and utensils. Seoul was founded in 1397 and became the capital in the latter part of the 16th century, but was sacked by the Manchus in the 17th century. It was closed to foreigners until within recent years, and there is still a strong prejudice against foreign visitors and modern improvements. Japanese troops occupied it in 1894 as a result of the war between China and Japan. Since 1905 the direction of public affairs has been in the hands of the Japanese. Population, 1916, 283,464.

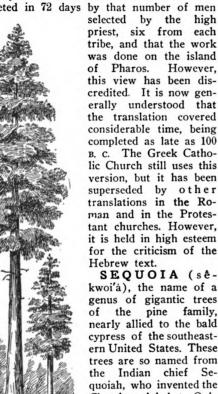
SEPARATOR (sep'a-ra-ter). See Creamery. SEPIA (se'pi-a), the name of a species of cuttlefish, characterized by having an organ known as the ink bag. It is very abundant in the Mediterranean and the waters off the southern shore of Asia. The animal uses the black fluid in the ink bag to darken the water when attacked by an enemy, and it is thus enabled to retreat or escape in obscurity. This product is used extensively in the manufacture of ink. It is taken from the animal and carefully boiled and filtered, and in this form constitutes the sepia of commerce, which is sold in cakes and sticks as India ink. When drawn from the animal it is black, but in the process of manufacture it takes on a beautiful brown color. It is used chiefly by painters, and to some extent as an ink.

SEPOY (se'poi), the name of native Hindu soldiers, which is used to distinguish them from the white or gora soldiers employed by the British. Efforts to train natives of good caste for the army were first made by the East India Company in the 18th century, who allowed them to use the sword and target instead of the musket, and to wear the turban, vest, and long drawers in place of regular uniforms. It was found that these soldiers rendered good service both in the English and French armies, facing danger with firmness and obstinacy. Soon after their number was increased, until in 1857 the Sepoys in the British service numbered 240,000, and the total army in India was only 300,000. In that year the high caste Hindus in the Bengal army incited the famous Sepoy Rebellion, which cost the British government many lives and fully \$200,000,000. The Sepoy soldiers in the British service at present number 140,000 officers and men, this being about twothirds of the present British army in India

SEPTEMBER (sep-tem'ber), the ninth month of the Gregorian year. It was the seventh month in the Roman calendar, the year beginning in March, as did the legal year in England until 1752. The Anglo-Saxons called it Gerst-month, or barley month, since that cereal was their most important crop, and ripens in September where these people dwelt.

SEPTIMIUS SEVERUS, Arch of, the name of a famous triumphal arch in Rome, erected by order of the senate in 203 A. D. It was dedicated to Septimius Severus and his two sons, Geta and Caracalla, and was erected to commemorate the victory over the Arabians and Parthians. Located on the Forum, at the end of the Sacred Way, it is one of the many historic structures of Rome. The arch is 75 feet high, has three passageways, and contains inscriptions and figures to represent scenes in the campaigns of Severus in Western Asia.

SEPTUAGINT (sep'tû-a-jint), or Alexandrian Version, the name of the earliest Greek translation of the Old Testament. Formerly it was believed that the version was completed in 72 days by that number of men



SEQUOIA TREES.

tant churches. However, it is held in high esteem for the criticism of the SEQUOIA (sekwoi'a), the name of a genus of gigantic trees of the pine family, nearly allied to the bald cypress of the southeastern United States. These trees are so named from the Indian chief Sequoiah, who invented the Cherokee alphabet. Only two species occur, the redwood and the mammoth, both of which are

native to California. The

mammoth may be re-

garded the largest of

However.

trees, since it attains a height of more than 300 feet and a diameter exceeding thirty feet. Some of the eucalyptuses of Australia attain a greater height, but contain a considerably smaller bulk of wood, since the trunk is much smaller in girth. The sequoia trees are found mostly in groves in the Sierra Nevada Mountains and range from Calaveras County, California, toward the south and southwest about 200 miles. Among the famous groves of these trees is the Mariposa Grove, 16 miles south of the Yosemite Valley. It contains about one hundred giant trees, measuring 40 feet in circumference, and several others measuring about ninety feet. The largest of the trees in this grove is called the Father of the Forest, which has been broken for many years, but its trunk is still 300 feet long and has a diameter of 40 feet. The Mariposa Grove is government property, and these trees are preserved as remarkable wonders of nature. The wood is soft and white when felled, but turns red afterward, and is very durable. It is evident that some of the larger trees now living range in age from 2,000 to 3,000 years.

SERAGLIO (så-rä'lyð), the old palace of the sultans at Constantinople, built by Mohammed II. on the site of the old acropolis. It is situated on an eminence that overlooks the sea, and its inclosing wall has a length of fully nine miles, within which are beautiful gardens, mosques, official buildings, and the harem. It has ample accommodations for 20,000 persons. The Seraglio is not used at present as the residence of the sultan.

SERAO (sā-rā'ō), Matilda, novelist, born at Patras, Greece, in 1856. Her father was a political exile from Italy and her mother was the Princess Scanary. She was left an orphan at an early age and was obliged to depend largely upon her own resources. After serving as a telegraph operator and a newspaper correspondent, she decided to devote her attention to literature. Her writings are classed among the best products of modern Italian novelists. They deal in a pleasing manner with the realistic, and are interwoven with psychological allusions. Her chief works embrace "Fantasy,"
"Ballet Dancer," "Land of Cockayne," "On Guard, Sentinel," and "Conquest of Rome."

SERAPIS (sē-rā'pĭs), or Sarapis, an ancient god of the Egyptians. This god was introduced in the time of Ptolemy I., who worshiped him with imposing honor. Plutarch and Tacitus relate that Ptolemy saw the image of a god in a dream, and was commanded to remove it from its place and bring it to Alexandria. Accordingly he sent an expedition to Sinope under the direction of a famous traveler, whence a colossal statue, originally made to represent Jupiter, was brought to Alexandria and declared to personify the god Serapis.

The name Serapis was derived from Osiris and Apis, and is said to have been the appellation given to the bull Apis after death, at the time it was made a god. The statue of Serapis was set up in a splendid temple at Alexandria, known as the Serapeum, to which was after-

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ward joined the celebrated library of Alexandria. This temple was the last place of security held by the pagans when Christianity was introduced, and the worship of Serapis ceased with the destruction of the image by the Christian archbishop in 398 A. D., as ordered by Theodosius. Recent excavations at Memphis and other ancient cities have brought to light numerous remains of statues built to this deity. Various writers recount that 42 temples were built to his honor, but worship in them was largely confined to the Greeks and Romans, the Egyptians as a class never admitting him as a sacred deity.

SERF, a person whose service is attached to the estate on which he lives and with which he may be transferred. Serfdom had a wide foothold in Europe during the Middle Ages under the feudal system, when the condition of serfs was not exactly that of slaves, but resembled it in many respects. Three principal classes of laborers were maintained in most European countries, the freemen, the villeins, and the Villeins occupied a middle position between the other two classes and could with considerable ease become freemen, but a serf could become free only by purchase or extended military service. However, serfs were not regarded personal or chattel property like slaves, but they could be transferred with the property to other owners. The serfs gradually decreased in number as the conditions of manumission became easier under the general spread of education, and with the adoption of systems that led to social and industrial evolution. Serfdom existed in Scotland as late as the 18th century. The tenant practice prevalent in Ireland is little better than a mild form of serfdom-a condition that may not be overcome until the tillers of the soil become enabled to own the land instead of being required to rent it. Russia abolished serfdom on March 17, 1861, a proclamation being issued at that time by Alexander II.

SERINAGUR (sa-rē'nŭ-gŭr), or Srinagar, a city of India, capital of Kashmir, on the Jhelam River, 175 miles northeast of Lahore. It is situated in a beautiful valley at an elevation of 5,275 feet, on both sides of the river, and has railway facilities and a large river The streets are narrow and poorly improved, and most of the buildings are of brick and timbers. Gardens are cultivated on many of the roofs. The principal buildings include two large mosques, several mission schools, and the central railway station. A short distance east of the city is Lake Dal, about five miles long and three miles wide, made famous in Moore's "Lalla Rookh." This lake and Lake Wular, about 21 miles northwest. are connected by a canal. The natives cultivate vegetables in these lakes on floating rafts, called gardens. Shawls, clothing, utensils, and attar of roses are manufactured in the city. Population, 1906, 124,865.

SEROUS MEMBRANE (se'rus), a delicate tissue in the human body, composed of flattened endothelial cells, normally moistened on the interior side by a serous fluid. It forms a covering or sac around certain organs, serving to allow free-organ action, and is associated with an absorbent system. The chief serous membranes are the two pleurae, inclosing the lungs; the pericardium, surrounding the heart; the peritoneum, lining the abdominal cavity; and the arachnoid, forming the middle of the three membranes enveloping the brain and spinal cord. The diseases to which these membranes are subject include dropsical effusions, morbid growths, hemorrhage, and inflammation, such as pericarditis and pleurisy.

SERPENT CHARMING, the art of influencing vicious and poisonous serpents to the extent that they may be handled without danger. The practice of charming serpents is of great antiquity, and was undoubtedly first practiced by daring persons who sought to inspire awe or gain advantages over the chiefs or their tribe. It is a part of some exhibitions, in which it is practiced to entertain or amuse the spectator. Many people of Asia travel from place to place and make their living by giving entertainments as snake charmers. Those who practice the art influence the serpents by use of the eve. by touch, and in some cases by whistling. In many instances the snakes are first rendered harmless by extracting the fangs, though this is not done by the more skillful serpent charmers.

SERPENTINE (ser'pen-tin), a mineral composed of magnesia and silica. It is widely distributed in all parts of the world. Serpentine occurs in all geological ages and forms large beds of primitive rock. The presence of iron and other impurities give it a great variation in color, which ranges through different shades of purple, red, green, yellow, brown, gray, and sometimes marbled and mottled. It takes a high polish, and is used in making ornamental articles, such as vases, boxes, and pillars. Serpentine may be divided into two general varieties, known as common and precious serpentine. The common class occurs as a rock. It is usually soft, is easily broken, and has serpentlike veins. Precious serpentine is the harder and more beautifully colored, but is of quite rare occurrence. Fine deposits of serpentine rock occur near Baireuth, Germany, in the Shetland Islands, Corsica, and many sections of Canada and the United States.

SERPENTS. See Snakes.

SERPENT WORSHIP, or Ophiolatry, a form of religious worship. It dates from remote antiquity, and is still practiced to a considerable extent in India and among many savage and semicivilized peoples. Serpent worship is considered quite closely associated with tree worship, which, as a form of religion, rose from the fact that most races of mankind at a certain stage of mental development held the view that

trees are the residences or embodiments of spirits or deities. Both are forms of nature worship, against which stern denunciations were made by the Jews, and in classical mythology there is wide mention of sylvan deities, elves, and fairies more or less associated with serpents and trees. Homer mentions the appearance of a serpent at the siege of Troy as an omen of victory to the Greeks, while Plutarch speaks of Alexander as having come from a serpent race. The Zulus of South Africa bring snakes into their homes, giving them the most devoted protection. Many of the American Indians practice serpent worship in various forms. These are only a few instances of many that may be named. The practice of worshiping serpents of different kinds and looking upon them as indicating good or evil, or possessing godlike power, is as old as human history. In India it is connected with Buddhism, even among the higher castes, but as a general rule the practice prevails most extensively among the less intelligent peoples.

SERPULA (ser'pū-la), a remarkable genus of sea worms. They belong to the tube order. Their tubes are of calcareous formation, by which they are attached to shells or rocks at the bottom of the sea, and some species live in groups with their tubes intertwined. The animal protrudes its head from the wider end of the tube, but on the slightest alarm withdraws completely into the opening. Many species have been described. Some have highly colored and curiously formed shells. They are extremely

sensitive to light, but possess no eyes.

SERUM THERAPY (se'rum ther'a-py), the theory in medical practice which relates to the cultivation of antitoxins in the serum of some animals and its application in the treatment of infectious diseases. The blood of a person suffering with an infectious disease is charged more or less with bacteria, and up to a certain stage their development in the patient increases. Bacteria of this class are known as toxins, and the active principles that develop in the serum and destroy the bacteria are known as antitoxins. Serum therapy is concerned with preventing the contraction of a disease by a patient as well as furnishing immunity against acquiring it.

Considerable progress has been made in developing the theory within the last few years, especially in the treatment of diphtheria. The antitoxin used in combating this disease is obtained from the serum of animals inoculated with cultures of the Klebs-Loeffler bacillus, and it is applied by injecting it hypodermically into the system of the patient. Treatment in this form is given to render persons immune to the disease as well as to destroy the malignant effect of the bacteria in persons already affected. It has been found that the injection is most effective when made between the shoulder blades. The mortality from diphtheria has been

reduced by treatment with antitoxin from 9 to 13 per cent., against 35 to 40 per cent. in cases in which other methods are employed.

Formerly serum therapy was limited to diphtheria, but more recently its field has been extended largely with good results. The mortality from cholera among laborers at Calcutta, India, has been reduced 72 per cent. It has been shown that the application of serum in the treatment of typhoid has been efficient in preventing the contraction of the disease, especially in the army of India and South Africa, where less than one per cent. of the inoculated men contracted the malady, while nearly three per cent. of the uninoculated men fell victims to it. Blood serum taken from horses has been employed with considerable success in combating the bacillus of the plague. According to a report of the Bureau of Animal Industry of the United States Department of Agriculture, it has been possible to largely decrease fatality from swine plague and hog cholera by the use of serum. These contagions result fatally in from 70 to 85 per cent. of the cases, but when treated with serum only 20 per cent. of the animals die.

SERVAL (ser'val), the name of an animal found in South Africa, classed as a member of the cat family. The body is from three to four feet long, including the tail, which has a length of fifteen inches. The color is tawny with black spots, the back has two longitudinal bands, and the tail is encircled by rings. It is about the size of the lynx, but not so savage, and the skins are known as tiger cat in the fur trade. The serval may be domesticated if taken when

young.

SERVETUS (ser-ve'tus), Michael, physician and theologian, born near Saragossa, Spain, in 1511; died October 27, 1553. His Spanish name was Miguel Servedo, and he was the son of a notary. He studied law in the University of Toulouse, France, but later devoted his attention to theology. Subsequently he traveled in Germany and Switzerland, where he became acquainted with the leading reformers and their doctrines, some of which he adopted. In 1533 he took up his residence at Lyons, where he studied medicine under the assumed name of Michel de Villeneuve, and subsequently removed to Paris. In the latter city he met Calvin, with whom he arranged for a discussion on theology, but failed to appear at the time appointed. In 1553 he published at Vienne, France, a work entitled "The Restoration of Christianity," in which he advanced doctrines that were distasteful to both the Reformers and the Catholics. Subsequently he was arrested at Geneva, Switzerland, where he was put to trial on charges of blasphemy, materialism, heresy, and pantheism. The decision was to the effect that Servetus should pay a fine and be burned at the stake by a slow fire, unless he declared his retraction. This he declined to do and both he and his books were burned. As

an anatomist he took advanced ground, in that he anticipated the discovery of the circulation of the blood made afterward by Harvey. The name of Servetists was later given to a small party in Switzerland which rejected the doctrine

of the Trinity.

SERVIA (ser'vi-a), a kingdom in the southern part of Europe, in the northwestern section of the Balkan peninsula. It is bounded on the north by Austria-Hungary, east by Rumania and Bulgaria, south by Turkey, and west by Austria-Hungary. The Drina River forms the western boundary, the Save and the Danube separate it from Austria-Hungary, and it is separated from Rumania by the Danube. The length from east to west is 165 miles, and the breadth from north to south is 150 miles. It has an area of 18,621 square miles.

DESCRIPTION. The surface is generally mountainous, being traversed by ranges of the Carpathian Mountains in the northeast, the Dinaric Alps in the west, and the Balkans in the southeast. The highest elevations are in the Rudnik Mountains, a chain belonging to the Carpathians, which are situated near the center of the country. These highlands have a general elevation of 3,500 feet and culminate in Great Schturaz, height 3,950 feet. Higher altitudes are attained on the southeastern border, where the highlands reach elevations of 7,000 feet above sea level. The country has an abundance of timber, both in the valleys and on the mountain slopes, and the soil is generally fertile. Oak and beech are the predominating forest trees.

The country lies wholly in the basin of the Danube, which carries all the drainage eastward into the Black Sea. Through the central part flows the Morava, the largest interior stream, and its valley contains the largest cultivated The Drina, on the western border, receives the inflow from the Jadar. The Timok, which forms part of the boundary of Bulgaria, flows into the Danube. Swampy plains extend along the Save and the Danube in Servia, where the climate is somewhat unhealthful. Rainfall averages 25 inches annually and is sufficient in all sections of the country for the cultivation of crops. In the highlands the climate is considerably colder than in the valleys and lowlands, but as a whole it resembles that of Central Europe rather than that of the region adjacent to the Mediterranean.

AGRICULTURE. Seventy per cent. of the area is productive. Agriculture, though still carried on without modern processes, is the chief industry. Corn is the principal cereal and the chief food of the people. Practically all the farms are small and tilled by the owners. The principal products, besides corn, are wheat, hemp, flax, tobacco, and fruits, especially pears, prunes, grapes, apples, and peaches. A large majority of the farms have a diversified line of interests, such as fruit growing, general farming, and stock raising. Oxen are used extensively as work animals. Other live stock includes cattle, sheep, goats, swine, and horses, Poultry is grown very extensively. The mulberry tree has been planted in large areas as a means of fostering silkworm culture.

OTHER INDUSTRIES. Though mining is still in a primitive state, some progress has been made in utilizing the deposits of coal, silver, lead, iron, clays, quicksilver, and building stone, all of which abound in considerable quantities. The chief manufactures are carpets, jewelry, embroidery, hardware, wine, machinery, clothing, and utensils. The exports include cereals, wine, wool, live stock, and lumber, and the imports embrace sugar, cotton, and machinery. Austria-Hungary has the greatest share of trade, and next in order are Germany, Russia, and Great Britain. The exports, amounting to \$14,500,000 per year, somewhat exceed the imports. Transportation is facilitated by the Danube and tributary rivers and canals. About 300 miles of river navigation is furnished by the Danube, the Drina, and the Save, and 925 miles of railways are operated, all under ownership and control of the government. The telephone, telegraph, and postal systems are efficiently managed.

GOVERNMENT. The government of Servia is a constitutional monarchy and the king holds his office by right of inheritance. He is assisted by nine ministers, but has large powers in executing the laws and filling the functions of supreme ruler. The national legislature is called the Skupshtina, whose membership is elected by the people, and in it is vested the power to approve or reject laws proposed by a council of state. All males over twenty years of age are obliged to serve actively in the army for two years and thereafter to drill short periods annually in the reserve. This gives the nation a total war strength of 225,000 men and a regular army of 20,000 men. It has no navy, but a number of the principal towns are strongly fortified. Greek Orthodox is the state religion, and is controlled by the minister of education and public worship. Practically all Servians belong to the state church, but other faiths are tolerated. A national system of education is maintained, and attendance at the common schools is compulsory. Admittance is alike free to all in the institutions of higher learning. The school system includes elementary and secondary schools, with articulated higher institutions, including colleges of agriculture, law, medicine, theology, sciences, and military science.

INHABITANTS. The people are Slavs and are known as Serbs or Servians. They are closely related to the Croatians of Austria-Hungary. A large number of these people reside in other countries, including about 250,000 in Montenegro, 1,325,000 in Herzegovina, and 2,340,000 in Austria-Hungary. Belgrade, at the confluence of the Drina and Danube, is the capital and largest city. Nisch, Kragouyévatz, Leskovatz. and Shabatz are thriving cities. The foreigners include about 35,000 Gypsies and 150,000 Rumanians. Population, 1914, 4,547,990

LANGUAGE AND LITERATURE. The Servian language is sometimes called the Illyrian, and forms one of the four divisions of the Slavonian tongue, but it is more closely allied to Russian than to Bohemian or Polish. Commercial intercourse with the Italians and adherence to the Greek religion have influenced the language by incorporating a number of Italian and Greek terms, but the dialect has been preserved with remarkable distinctness. It has a considerable literature, mostly poetry and works on theology. Among the most eminent of Servian writers is George Brankovitch (1645-1711), who wrote "History of Servia," a work that records the national events from the origin of the nation to his own time. Little advance was made in the culture of the language until Vuk Stephanovitch, in 1814, published his "Grammar of the Servian Language." He gathered the best poetic productions in the Servian and published them under the title of "Songs of the Servian People." A long list of recent writers may be mentioned in law, lyric and dramatic poetry, jurisprudence, history, and theology. The revival of interest is due to the liberation from Turkish rule and a more general spread of education. The Servians are noted for their love of freedom and personal valor, and they comprise one of the most gifted and progressive classes of the Slavonian peoples.

HISTORY. The history of the region now occupied by Servia dates from the early historic period of Europe. It was anciently inhabited by Thracian or Illyrian races, who became subject to the Romans shortly before the Christian era, and was formed into the province of Moesia. With the decline of Rome it was successively occupied by the Huns, Ostrogoths, and Lombards. About the middle of the 6th century it reverted to the Byzantine emperors, but in the next century it came into the possession of the Avares. In 638 the Servians moved from the slopes of the Carpathians into Servia and Bosnia, where they became converted to Christianity, and soon after united with the Byzantine rulers to expel the Avares. Their settlements were greatly extended toward the northwest, and about 1060 Michael Bogislav succeeded in expelling foreign claimants and assumed the title of king, receiving at the same time recognition from Pope Gregory VII. Successive wars to maintain independence terminated successfully, and in 1165 Stephen Nemanja founded a dynasty that prevailed two Stephen Dushan (1336-1356) was the most distinguished monarch of the Nemanja dynasty. He succeeded in defending his dominion against foreign opposition, united under his government the countries of Macedonia, Bulgaria, Thessaly, and Albania, and successfully maintained independence of the

advancing Turks. After his death the Turks became more successful, and Lazar I., who had founded a new dynasty in 1375, was not only defeated in the decisive Battle of Kossova in Albania, in 1389, but was slain.

The country kept up a form of independent existence until 1459, when it became a Turkish province under Sultan Mahmud, to remain under Moslem control nearly 200 years. In the meantime it was the scene of many bloody contests between the Turks and Hungarians. In 1718 the greater part of Servia became tributary to Austria by the Peace of Passarovitz, but the Treaty of Belgrade, in 1739, ceded the territory back to Turkey. Turkish oppression was the cause of a number of insurrections. The first of these occurred under the leadership of Czerny George in 1804, who, with the aid of Russia, expelled the Janizaries. The Peace of Bucharest, May 28, 1812, established the independence of the country. War broke out anew in 1813 and terminated successfully for the Turks, while Czerny George became a refugee in Austria.

Milosh Obrenovitch united all of Servia in arms in 1815, and after a long and disastrous war attained victory, being elected prince in 1829. The following year Turkey granted autonomy to Servia and recognized Prince Milosh as hereditary sovereign. He was compelled to abdicate in 1839 in favor of his son, Milan, who was shortly after succeeded by his brother, Michael, but the latter was forced to abdicate in 1842. Alexander Kara-Georgevitch, son of Czerny George, was elected prince, but being a weak ruler he was compelled to abdicate in 1859. Milosh Obrenovitch was recalled, but died soon after and was succeeded by his son, Michael, in 1860, who was assassinated on July 10, 1868, by partisans of Prince Alexander. Milan Obrenovitch, grand-nephew of Milosh, became prince, and in 1876 joined Herzegovina and Montenegro in a war against Turkey, but the Servian forces were defeated in the decisive battle at Alexinatz.

In 1877 Russia declared war against Turkey, and after the fall of Plevna, in the same year, the Servian forces rallied to the support of the Russians. The treaty of peace concluded at Berlin on July 13, 1878, gave Servia its independence, and in 1882 a kingdom was erected with Milan I. on the throne. This sovereign abdicated in favor of his son in 1889 and died in Vienna, Austria, February 11, 1901. His son succeeded him under a regency as Alexander I., and on April 13, 1893, took full charge of the government. He was assassinated in 1903, and Peter Karageorgevitch was proclaimed king. In 1913 the country became a leader in the Balkan War, aiding in the capture of Adrianople. The Austro-Germans captured Belgrade in 1914, and by 1915 they and their Bulgarian allies occupied the entire country.

SERVIUS TULLIUS (ser'vi-us tul'II-us),

the sixth king of ancient Rome, who probably reigned from 578 to 534 B. c. His life is wrapped in fables and traditions. He is generally supposed to have been the son of a slave, but was brought up in the home of Tarquin, whose daughter he is said to have married. He succeeded Tarquin as King of Rome, and is said to have adopted a constitution which made landed property the basis of the military system. In this way he admitted the plebeians to a place in the army and the government. In the latter part of his reign he concluded an alliance with the Latins, constructed several temples, and added the Esquiline, Quirinal, and Viminal hills to the city of Rome.

SESAME (ses'a-me), a genus of plants, many of which are cultivated for their seeds in Asia and Africa. The common sesame, or Sesamum indicum, is of the herb order. It grows to a height of from two to three feet, has opposite leaves, and bears pinkish or yellowish flowers. The seeds are valuable, yielding the so-called gangli oil. This product has a sweet taste. It is used for food, lighting, and oiling, and will keep for many years without becoming rancid. It is used in some countries as salad oil and in preparing cosmetics. The leaves of the plant yield a gummy substance used for poul-

tices and in preparing a light drink.

SESOSTRIS (se-sos'tris), the name given by the Greeks to a famous King of Egypt, who is supposed to have reigned for 66 years, beginning about 350 B. C. Early Greek writers assert that he divided Egypt into 36 districts and placed his brother as regent over them, and that he personally conducted a vast army into Libya, Arabia, India, Asia Minor, and finally Europe. They assert that he subdued Ethiopia, placed a large fleet on the Red Sea, and made the islands south of Asia subject. Many of the magnificent temples are assigned to him. He is thought to have been the builder of a wall 187 miles long at the border of the Libyan Desert, and of many obelisks or columns, on which historic views of his conquests were engraved. These and other improvements were built by captives that he brought to Egypt from the conquered lands. According to some accounts, he became blind and decrepit in his old age, and took his own life. Some writers identify the exploits assigned to Sesostris as those accomplished by Rameses II., while others regard the name as personifying the achievements of several consecutive monarchs of Egypt.

SETI I. (sā'tē), King of Egypt, the first ruler of the nineteenth dynasty. He was the son of Rameses I. and ruled for 27 years. During his period were erected many great buildings in Thebes and other cities of Egypt. Inscriptions giving information of his campaign against Syria and Palestine have been discovered at Karnak and elsewhere. He was succeeded by Rameses II. Seti II., the grandson of Rameses

II., was the fourth ruler of the nineteenth His tomb is preserved at Biban-eldynasty. Moluk.

SETON (se'tun), Ernest Thompson, author and lecturer, born at Shields, England, August 14, 1860. He was brought to Canada at an early

age, and made his home in the woods from 1860 to 1870. In the latter year he went to Toronto to be educated in the public schools and at the Collegiate Institute. He went to England in 1879, where he studied two years, and came to Manitoba in 1881. The following year he took up his resi-ERNEST THOMPSON SETON. dence on the plains,

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spending much of his time in Texas and New Mexico. He was made official naturalist to the government of Manitoba in 1891, in which position he rendered valuable service through his extensive knowledge of wild animal life, acquired by actual experience in the woods and on the plains. While many naturalists have criticised adversely various accounts published by him, his lectures and books have induced greater interest and more careful study of the life and habits of animals. Among his books are "Birds of Manitoba," "Biography of a Grizzly," "Art Anatomy of Animals," "Wild Grizzly," "Art Anatomy of Animals," Animals I Have Known," "Two Little Savages," "Lobo, Rag, and Vixen," and "Animal Heroes."

SETTER, a breed of dogs originally trained to indicate the presence of game birds by crouching close to the ground, but now usually taught to stand rigid like a pointer. Russian setters have woolly fur and a bearded muzzle, and are noted for their keen scent. The English and Irish setters have narrow muzzles, long ears, silken hair, and a quick, keen eye. Scotch, or Gordon, setter received its latter name from the Duke of Gordon, who, in 1800, bred a number of these dogs. Its color is a rich black, with tan on the legs, face and chest.

SEVEN PINES. See Fair Oaks.

SEVEN SLEEPERS, in legendry, seven Christian youths of Ephesus, who escaped the persecution of Decius by finding safety in a cave. Here they were afterward found by the enemy, who walled up the entrance to the cave with great stones, that the Christian youths might die of hunger. Instead of succumbing to starvation, they fell into a deep sleep, and in future generations they were entirely forgotten. It is supposed that they were inclosed in the cave in the year 251, and were awakened by some shepherds of Ephesus, who were seeking shelter for their cattle, in 447 A. D. One of

their number was immediately sent to buy bread and other articles of food, but on reaching the village he became astonished that the cross had been raised in many places and a different civilization confronted him than he had ever before experienced. On offering to pay the baker with a coin of Decius instead of one bearing the imprint of Theodosius II., who had in the meantime become king, he was placed under arrest, but was released on showing the officers the cave where he and his six companions had slept for 196 years. Theodosius hastened to the spot in order to confirm the report, and was impressed with the truth of the resurrection of the dead. The Seven Sleepers relapsed into a deep sleep immediately after conversing with Theodosius, to be awakened only on the resurrection morn. June 27th has been consecrated to their memory by several Christian churches. A similar legend is current among the Mohammedans.

SEVENTH DAY ADVENTISTS. See Adventists

SEVEN WEEKS' WAR, the name given to the War of 1866 between Prussia and Austria. It was caused by the unsettled conditions in Schleswig-Holstein. Bismarck had wisely planned to consolidate the German states under the leadership of Prussia, and with that end in view concluded an alliance with Italy. When Austria violated the Treaty of Gastian. by which the Schleswig-Holstein question was supposed to have been settled, Prussia was joined by Italy and most of the North German states, while Bavaria, Hanover, Hesse, Saxony, and Württemburg supported Austria. armies promptly invaded Austrian territory and defeated an army of Saxons and Austrians in the Battle of Sadowa, or Koniggratz, after which they marched upon Vienna. Archduke Albert, who commanded the Austrian forces in Italy, was compelled to withdraw from Verona to aid in defending the capital. However, the Austrian fleet under Admiral Tegetthoff defeated an Italian fleet under Persano. In the meantime the army of Hanover and the South German states was compelled to surrender, and Austria had no recourse but to sue for peace. The war was ended by the Treaty of Prague, which incorporated Frankfort, Hanover, Hesse, Nassau, and Schleswig-Holstein with Prussia. By its terms Austria ceased to be a member of the Confederation, and special treaties were made by Prussia with Baden, Bayaria, the Grand Duchy of Hesse, Saxony, and Württem-

SEVEN WISE MEN, or Seven Sages of Greece, the designation applied to a number of Greek sages, who were devoted to the cultivation of practical wisdom. They lived about 620-548 B. C. Writers attribute to them a number of maxims of prudence and morality, but there is no uniformity among the ancients either as to the names or the sayings of these sages. The list of names and characteristic savings are usually given as follows:

Bias of Priene in Caria-"Too many workers spoil

Bias of Priene in Caria—"Too many workers spoil the work."

Chilon of Sparta—"Know thyself."
Cleobulus of Rhodes—"Moderation is the chief good."

Perlander of Corinth—"Forethought in all things."
Pittacus of Mitylene—"Know thy own opportunity."
Solon of Athens—"Nothing in excess."
Thales of Miletus—"Suretyship brings ruin."

SEVEN WONDERS OF THE WORLD, the name applied by ancients to seven monuments, all of which possessed remarkable splendor or magnitude. The term originated in Greece after the time of Alexander the Great, and Philo of Byzantium made them the subject of a descriptive work. These structures included the Hanging Gardens of Semiramis at Babylon, the Pyramids of Egypt, the Temple of Diana at Ephesus, the Colossus of Rhodes, the Pharos of Alexandria, the Statue of Jupiter at Athens by Phidias, and the Mausoleum at Halicarnassus.

SEVEN YEARS' WAR, the famous contest for the possession of Silesia. It was waged by Empress Maria Theresa of Austria against Frederick the Great of Prussia, and continued from 1756 to 1763. Silesia had previously belonged to the Austrian dominions, but was annexed to Prussia at the time of the war for succession to the throne of Austria, and in 1756 the empress took advantage of the circumstance that Frederick the Great was opposed by a number of European powers. She formed an alliance with France and Russia, while Frederick was supported by four of the smaller German states and England. The first decisive battles were fought in Saxony in 1756, when Frederick occupied Dresden and other chief cities of that region. The war continued with varying success, Frederick holding out bravely against an immense opposing army, until the death of Empress Elizabeth of Russia, in 1762, when Peter III. ascended the throne. This sovereign was a great admirer of Frederick. He immediately restored East Prussia to him and sent an army of 15,000 men to his assistance, thus turning the tide in favor of Prussia. The last decisive battle was fought at Wilhelmsthal on June 24, 1762, when the French were defeated and surrendered to the allies of Prussia. War was terminated by the Treaty of Humbertsburg on February 15, 1763, which confirmed the title of the Prussian throne to Silesia. A part of this extended war was carried to India and America by the French and English, the latter phase of it being known in American history as the French and Indian War. The result was that France lost all of Canada and decided advantages in India. See French and Indian Wars.

SEVERN (sev'ern), a river of western England, the second largest of that country, being exceeded only by the Thames. It rises in the mountains of Wales, and, after flowing north-

east to Shrewsbury, it assumes a circuitous course toward the southwest and flows by a wide mouth into Bristol Channel. The total length is 210 miles, of which 180 miles are navigable, and its basin has an area of 8,575 square miles. Extensive improvements have been made to Worcester, and several canals enlarge its commercial importance. It receives the waters from the Tern, Teme, and Avon rivers. The valley is fertile, and is the seat of many manufacturing cities.

SEVERUS (sē-vē'rŭs), Alexander, Roman emperor, born at Arca, in 205; slain in 235 A. D. He was of Syrian parentage, and origi-



nally was named Alexius Bassianus, but was adopted by Emperor Heliogabalus, and assumed the name by which he is known in history. His education was received at Rome, where he attained a wide popularity, and at the death of the emperor, in 222, was proclaimed sovereign by the praetorians and

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ALEXANDER SEVERUS. confirmed by the senate. His reign was prosperous and peaceable until he declared war against the Persians in 231, the contest checking Persian advance, but not maturing to the material advantage of the Romans. The Germans invaded Gaul in 235, and he personally commanded the Roman army against them, but was slain in a mutiny by his own men.

SEVERUS, Lucius Septimius, Roman emperor, born in the African town of Leptis Magna, April 11, 146; died Feb. 4, 211 A. D. His family was of the equestrian rank and provided well for his early education. He afterward removed to Rome, where he was made praetor in 178. After commanding the army in Gaul, he became governor of Gallia, Pannonia, and other provinces, and in 193 was proclaimed emperor as successor to Pertinax. However, Didius Julianus had been placed on the imperial throne by the praetorians before Severus reached Rome, but he successively defeated him and other rivals, banished the praetorians, and won the support of Albinus, commander of the Roman forces in Britain, by conferring upon him the title of Caesar. Shortly after he made an extended campaign in the East, which was followed by capturing Byzantium after a three years' siege.

Clodius Albinus became ambitious a second time to occupy the throne of Rome and accordingly organized a force of 150,000 men, but was defeated by Severus with great loss at Lyons in 197. The latter soon after returned to Rome, where he distributed much valuable property secured on his extensive campaigns,

but subsequently made a second expedition to the East to repel an invasion of the Parthians and suppress insurrections in Seleucia and Babylonia. He crossed into Egypt from Parthia, where he captured Alexandria, and soon after returned to Rome with a large amount of wealth and gold, which he lavished upon his soldiers and subjects. A rebellion in Britain required him to lead an army across the English Channel in 208, and while on the island marched into Caledonia. To provide a defense against the Caledonians, he built a wall from the Solway Firth to the Tyne River. He died at York three years after entering Britain.

SEVIER (se-ver'), John, soldier, born in Rockingham County, Virginia, in 1745; died Sept. 24, 1815. He descended from French parents and at the age of 16 years became a pioneer on the Holston River, in what is now Tennessee. Here he built Fort Watauga and fought against the Indians. During the Revolutionary War he sided with the Americans, taking part in the Battle of King's Mountain and other engagements. In 1785 he was chosen governor of the State of Franklin, which comprised parts of North Carolina and Tennessee. When this State was broken up and made a part of North Carolina, he was elected to Congress, in 1790. He was elected Governor of Tennessee in 1796 and was several times reëlected, and subsequently served in Congress two terms, from 1811 until 1815.

SÉVIGNÉ (så-vên-yå'), Maria de, eminent letter writer, born in Paris, France, Feb. 6, 1626; died April 18, 1696. She was a daughter of the Baron of Chantal, who lost his life in the war against England in 1627, and her mother died a few years later. She was trained under her maternal uncle, the abbé of Coulanges, who provided amply for her education, giving her the advantages of a liberal course in French, German, Italian, Spanish, and Latin. In 1644 she was married to the Marquis of Sévigné, a Breton of good family but small estate, who was killed in a duel in 1651. She never married again, though many opportunities of considerable merit were presented, but instead devoted herself to the culture of her two children, a son and daughter. The daughter, Françoise Marguerite, became Madame Grignan in 1669, and accordingly accompanied her husband, Marquis Grignan, to Provence, where he held the rank of lieutenant general. Thus the opportunity for the many letters written by Madame Sévigné was presented. These letters cover the principal events of European history for about 25 years. They are of value alike from the standpoint of history and the charming style in which they are written, and sparkle with remarkable affection, wit, frankness, and careful scrutiny of human character. A complete edition of these writings was not printed until 1726, thirty years after her death.

SEVILLE (se-vil'), a city in Spain, on the

Guadalquivir River, capital of the province of Seville, sixty miles northeast of Cadiz. occupies an imposing site on the east bank of the river, which is crossed by a number of bridges, and is surrounded by walls of Moorish construction. These walls contain 66 towers and may be entered by fifteen gates. Most of the streets are narrow, but in the newer parts considerable improvement has been made by widening them materially and constructing modern forms of architecture. It is an important railroad junction, has substantial pavements in the newer parts, and modern municipal facilities have been introduced to some extent, particularly electric lighting, sewerage, and The chief manufactures are rapid transit. leather, cotton textiles, silk and woolen goods, pottery, tobacco products, machinery, hardware, soap, leather, and utensils. It is important as a port of entry, having a large interior and foreign trade and a moderately spacious harbor.

The city is rich in ancient forms of architecture, the most important being a Gothic cathedral, a handsome Moorish palace, and numerous churches, halls, and hospitals. The bull ring is a stone structure with a capacity for 15,000 spectators. It has an aqueduct of 410 arches dating from Moorish occupation. Besides the public schools, it has a large number of convents and academies, several institutions of higher learning, and numerous parks and gar-The cathedral contains the tombs of Ferdinand, the son of Columbus, and Ferdinand III. of Castile, besides a large number of excellent sculptures, carvings, and an organ with

5,400 pipes.

Seville is an ancient city and was called Hispalis by the Romans. No city of Europe contains finer remains of Moorish art and architecture, and none has a more interesting history. In the later part of the Roman period it rose to great importance, and during Vandal and Goth occupation it served as the capital of southern Spain. It fell into Moorish possession in the 8th century, when it rose to a city of 400,000 people, and in 1026 was made the capital of the Moorish kingdom. Ferdinand III. of Castile conquered it in 1248, but it remained the capital of Spain until the reign of Charles V., when that distinction was transferred to Valladolid. The discovery of America gave it an immense trade with the colonies. At that time it rose to the height of its prosperity, but much of its importance was soon after lost by trade centering at Cadiz. The French un-der Marshal Soult captured the city in 1810 and inflicted much damage, and in 1843 it was forced to surrender to Espartero. Population, 1905, 150.182; in 1910, 155,366

SEVRES (sa'vr'), a town in France, on the Seine River, six miles southwest of Paris. It is noteworthy because of its extensive manufacture of porcelain, being the seat of the large factory removed thence from Vincennes in 1756. Porcelain products of elegant design and beautiful painting are produced here, some of the products being classed among the most valuable in the world. The town was captured by the German army in 1870, when its beautiful porcelain museum was partially destroyed by the bombardment afterward conducted by the French. It was attacked by the troops of the Commune in 1871. Population, 1916, 8,661.

SEWALL (sū'al), Arthur, shipbuilder and public man, born in Bath, Me., Nov. 25, 1835; died there Sept. 5, 1900. After attending the public schools, he entered the shipyards of his father at Bath, and in 1854 formed a partnership with a brother for constructing sailing ves-The firm continued business until the death of the elder brother in 1879, when the institution passed to the ownership of Arthur Sewall and his sons. The Roanoke, which was the largest wooden ship constructed in the United States, was built at these yards, and at the same place was built the Dirigo, the first steel ship completed in America. Sewall was interested in the Bath Iron Works, served as president of the Bath National Bank, and was president of the Maine Central Railroad from 1893 to 1894. He was an active and influential member of the Democratic party and was the nominee of that party for Vice President in 1896, but failed of election.

SEWARD (su'erd), William Henry, statesman, born in Florida, N. Y., May 16, 1801; died Oct. 10, 1872. In 1820 he graduated at

Union College and, after taking a law course, entered the practice at Auburn. He was elected to the State senate as a sympathizer with the anti-Masonic movement in 1830, and four years later was defeated for Governor as the Whig candidate, but was elected to that office in 1838 and in 1840. He entered



WILLIAM H. SEWARD.

the United States Senate in 1849, where he at once attained to leadership as an orator and opponent of slavery, and as such opposed the admission of Texas as a slave-holding state. When the Republican party was formed, he was among its foremost orators, and in 1860 became a prominent candidate for President in the convention that nominated Lincoln, whom he gave his earnest and hearty support.

President Lincoln appointed Seward Secretary of State and during his term of service, from 1861 to 1869, the important events of the Civil War and of reconstruction took place. Among the notable questions was the Trent Affair (November, 1861), and it was due to his wise counsel that war with England was averted. He took an efficient part in averting trouble with France at the time Maximilian was executed in Mexico. The purchase of Alaska from Russia, in 1867, is another important event in which he rendered distinguished service. Seward was severely stabbed by one of the conspirators implicated in the assassination of Lincoln on April 14, 1865, his assailant entering the bedroom in which he was confined on account of a broken jaw and arm, an injury received shortly before by being thrown from his carriage. He traveled extensively after retiring from office and is the author of several works. Among his published works are "Life of John Quincy Adams," "Speeches," and an "Autobiography." He delivered eulogiums in the Senate on Webster, Clay. Clayton, Broderick, and Rusk.

SEWELLEL (se-wel'lel), the name of a small rodent of North America, found in the Pacific coast region from British Columbia to the northern part of California. It somewhat resembles the beaver, but in size is similar to the muskrat. The tail is short, the eyes are small, the body is plump and heavy, and the color is reddish-brown. These animals live in colonies and lay up food for the winter by collecting ferns and the woody parts of plants. These are carefully dried before being placed in the burrows. Their fur is soft and is used as an article of dress by the Indians.

as an article of dress by the Indians. SEWERAGE (sū'ēr-āj), the method of coilecting and removing refuse matter from dwellings and cities. The removal of waste materials and the disposal of them to the best advantage, or with the least possible liability of causing damage, are questions of vast importance. These problems may be solved only by studious investigation of the conditions existing in the locality affected, and the establishment of adequate sewerage systems involves the expenditure of large sums of money. The utility of supplying sanitary and drainage sewers in large towns and cities is apparent, since convenience and health depend upon removing the impurities. This is necessary in order to prevent them from contaminating the atmospheric air and the soil while in a state of decay.

Two general sewerage systems are constructed. In one class both the surface drainage and the sewage are carried in a combined system, while in the other a double system is provided, one for conveying the sewage proper and the other for rain water and surface drainage. Formerly the combined system was used almost exclusively, and where it now exists additional districts are usually drained on the combined plan, since it is difficult to change from one to the other, but towns and cities putting in entirely new systems generally use the separate plan. The advantage arising from the newer mode of construction is that much larger conduits are necessary to convey rain

water and surface drainage than are required for the sewage proper, and in many cases surface water can be carried into natural water courses by inexpensive artificial channels. Sewers vary in size from a small pipe to a tunnel large enough to be traversed in a boat, this depending altogether on the size of the district to be drained and the amount of fall that is afforded by the natural aspect of the region. The most common method of sewerage is simple flow by gravity to the nearest river or body of water, but sometimes the configuration of the surface makes pumping necessary to cause or aid the flow. Where such disposition by either of these methods is impracticable the sewage is sometimes filtered on a large scale or is chemically deodorized, or precipitated, the solid part being used in the preparation of fertilizers.

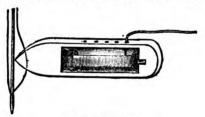
Many of the smaller towns and certain districts in the larger cities employ vitrified clay pipe in constructing sewerage, but where a large quantity of matter must be disposed of tunnels are built of brick or stone. It is aimed to make the system proof against leakage, thus preventing a contamination of the soil, for which purpose sealing of asphaltum or some other material is applied. Sewer pipe is usually from 18 to 36 inches in diameter. It is possible to so construct a system with pipes of this kind that practically all leakage can be overcome and provisions usually are made whereby it can be kept clean by flushing with water. Such a system has the advantage that pipes have a greater carriage capacity for a given size than brick sewers, and they may be easily flushed from automatic flush tanks to prevent the formation of gases, by removing sewage before offensive decomposition has time to begin.

In most American cities the sewerage systems are owned by the cities themselves, but there are some under the control of private companies, as in Galveston, Atlantic City, Phoenix, and about twenty others. In many instances the sewage is discharged into the open sea and is carried away by the tides, in others it is discharged into rivers, and in some the sewage is conducted either through channels or carried by conveyance to special localities and utilized for fertilizing, as is the case in Berlin and other European cities. Private ownership of sewerage is not favored to any great extent, since it is thought that the public health may be better protected under public ownership.

SEWING MACHINE, a machine for sewing or stitching fabrics, leather, paper, and other materials. At present many kinds of these machines are sold in the market, all of them having an important use for one or more particular purposes, and serve useful functions in the manufacture of a large variety of products. Formerly all sewing was done by hand with needle and thread, and the first attempt to construct a machine to serve that purpose sought to imitate the hand movements in sewing. The first in-

vention of this class was made by a German named Charles F. Weisenthal, in 1755, who made use of a double-pointed needle, with the eye in the center, and two pairs of pincers alternately seized the needle and passed it above and below the cloth. This principle was utilized later by Heilmann in constructing an embroidering machine that he exhibited in Paris in 1834. Little progress was made in sewing-machine construction until Elias Howe, of Cambridge, Mass., secured a patent, in 1841, for his lock-stitch machine. This stitch is now used in most machines, and the royalty received by Howe from manufacturers amounted to about \$2,000,000.

Two threads are used in the lock-stitch, the one being pushed through the cloth by the needle to form a loop at the lower side, while the other is on a bobbin within a shuttle and is carried through the loop, thus forming a stitch that is securely locked and cannot be undone by pulling. Some machines use a slide shuttle, as shown in the illustration, others have an oscillating shuttle, and still others employ a rotating hook that serves the same purpose. Previous to the invention of the lock-stitch, Isaac M. Singer invented a machine that made the chain-stitch, but this had the disadvantage that the whole seam became undone if one end of the thread was pulled. To overcome this defect he devised a plan to tie a knot in the seam at every eighth stitch by means of an ingenious mechanism. Allan B. Wilson is the inventor of the rotary hook and bobbin long used in the Wheeler and Wilson machine and he also patented, in 1850, the four-motioned feed, which is now used in nearly all machines. Since then innumerable improvements have been



SLIDE SHUTTLE.

made, and machines are employed for purposes so varied that it is impossible to enumerate more than a few of the more important. These include the sewing of ordinary textiles and car-They embrace machines for sewing peting. buttonholes, stitching shoes, sewing gloves, making satchels and mail bags, and hemming the finest textiles. In the larger clothing factories and book establishments machines are operated largely by electric and steam power. Formerly machines for family use were turned by hand after being fastened to a table by set-screws, but now they are generally mounted on a table, and worked by means of a treadle with the foot. Sewing machines of American manufacture are rated among the best and are sold in all the countries of the world.

SEXTANT (sěks'tant), an instrument used in surveying land and in making nautical observations, especially in measuring the angular distance between two objects. It has superseded the quadrant for observation at sea on account of its greater portability, while for important land surveys the whole circle is preferred. The sextant consists of a frame, usually of metal and ebony, made firm by cross braces. It has an arc of 60° and by the use of two reflecting mirrors, one silvered entirely and the other silvered over half its surface, it includes a range of 120°. Other parts include an eyepiece, a movable arm to carry the fully silvered mirror and a vernier, and a graduated scale of degrees, minutes, and seconds. This instrument was invented by Sir Isaac Newton in 1672, but many improvements have been made. The arc of a sextant used for astronomical purposes is usually made in the form of a complete circle, when the instrument is known as a reflecting circle. In this form greater precision in the observations can be obtained.

SEYCHELLES (så-shěl'), a group of small islands in the Indian Ocean, about 675 miles northeast of Madagascar. They include about 80 islands and islets, with a total area of 148 square miles. Mahé, the largest of the group, contains 55 square miles. These islands are mountainous, the highest summits being about 3,000 feet above sea level, but coral reefs surround them. The climate is equable, with temperatures ranging from 74° to 88°, and the rainfall is quite excessive, ranging from 90 to 100 inches. Cotton, sugar cane, coffee, rice, tobacco, and fruits are the leading productions. Salt fish, cacao, coffee, and fruits are exported. These islands have been a British possession since 1794, but previous to that time they were colonized by France. Port Victoria, on Mahé, is the seat of government. Only four of the islands are inhabited and the people consist chiefly of Negroes and French Creoles. Population, 1917, 19,834.

SEYMOUR (se'môr), a city of Indiana, in Jackson County, sixty miles south of Indianapolis. It is an important railroad junction, has a large local and jobbing trade, and is surrounded by a fertile agricultural and dairying The principal buildings include the country. high school, the public library, the Saint Ambrose Academy, and many churches. Electric lighting, pavements, and waterworks are among the improvements. The manufactures include furniture, carriages, harness, ice, flour, woolen goods, and machinery. It is the seat of important railroad machine shops. The place was settled in 1852 and incorporated in 1865. Population, 1900, 6,445; in 1910, 6,305.

SEYMOUR, the name of a noble family of England, so called from Saint-Maur in Normandy, whence the ancestors came to England.

In the 13th century they acquired holdings in Monmouthshire and later added to these estates by conquests and by marriage. Sir John Seymour, the head of the family, in 1497, aided in suppressing the Cornish Rebellion. His daughter, Lady Jane Seymour, became the third wife of Henry VIII. in 1537, the day after the execu-tion of Queen Anne. She was the mother of Edward VI. and was prominent as a sympathizer of the Protestant Reformation. Thomas Seymour, fourth son of Sir John Seymour, married Catherine Parr, the widow of Henry VIII. His brother, Edward Seymour, was rapidly promoted and became Duke of Somerset in 1546. Subsequently he was made protector and governor of the king, but became unpopular and was beheaded on Tower Hill in 1851.

SEYMOUR, Horatio, statesman, born in Pompey Hill, N. Y., May 31, 1810; died Feb. 12, 1886. After studying at Hobart College, he entered Partridge's Military School, and later took a course in law. He was admitted to the bar in 1832, and in 1841 entered the New York Legislature as a Democrat. In 1843 and in 1844 he was elected mayor of Utica, and in 1852 became Governor of the State, but was defeated for the same office two years later. He was again elected Governor of New York in 1862, and as such was an efficient officer, but opposed the emancipation proclamation issued by President Lincoln. In 1864 he refused to be a candidate for President. However, he accepted the Democratic nomination in 1868, but was defeated in the election by General Grant. At the election Seymour and Blair received 2,703,600 votes, against 3,013,188 votes cast for Grant and Colfax. He retired from public life soon after, but subsequently was president of the prison association of the United States

SFORZA (sfôr'tsà), Francesco, eminent Italian military leader, born in 1401; died March 8, 1466. His father was the Count Alberigo de Barbiano (1369-1424), founder of the Italian family of Sforza, so called from the band of condottiere, a class of soldiers notea for their daring. The Sforza family played an important part in the affairs of Italy in the 15th and 16th centuries, not only influencing the government of northern Italy, but also a number of powerful European sovereigns. Francesco succeeded his father in the office of constable of the kingdom of Naples under Queen Joanna II. in 1424, and, as the custom permitted, fought under the sovereigns that gave the largest pay. Owing to skillful discipline and improvement in military tactics, he became recognized as the leading military influence and at various times fought for or against Venice, Florence, Milan, and the Pope. His success brought him into high standing with the Duke of Milan, whose daughter he married, and shortly after he obtained Ancona and Pesaro from the Pope. In 1450 he succeeded to the dukedom of Milan and as duke secured control of all Lombardy, besides a number of possessions south of the Po. while Louis XIV. ceded Genoa and Savona to him. He possessed only a limited education, but patronized learning and encouraged the establishment of schools. Five dukes of the Sforza family succeeded him. Francesco II. (born in 1492) was the last of the line, dying on Oct. 24, 1535, when the possessions of the

house passed to Italy.

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SHAD, a genus of fish of the herring family, but differing from the herrings proper in having a longer and deeper body and notches in the upper jaw. Writers have described a number of species that are more or less widely distributed and all are esteemed for food. inhabit the sea near the mouths of rivers and ascend the current in the spring to spawn. The American shad is caught off the Atlantic coast from the Gulf of Mexico to Newfoundland and has been successfully naturalized and planted in the Pacific. It attains a length of twenty inches and a weight of two to ten pounds. The best known species of Europe are the allice shad and the thwaite shad. The former attains a weight of about eight pounds and has fineflavored flesh, while the latter is smaller, weighing about two pounds, but its flesh is coarser than that of the allice. The shad is bred extensively by the fish commission.

SHADDOCK (shăd'dŭk), a tropical tree of the citrus or orange genus, sometimes called pompelmoose. It is cultivated for its fruit. The fruit resembles the orange, having a pale yellow color and a juicy interior of a slightly acid taste. The shaddock is native to Eastern Asia, whence it was brought to America by Captain Shaddock, from whom it was named. Many species have been obtained by propagation, several of which are cultivated in Florida, California, and the West Indies. The great fruit, or pomelo, bears a fruit about the size of a large orange, while the fruit of the pompelmoose has a diameter

of about eight inches.

SHADOW, the obscurity of light within an illuminated region, caused by intercepting the passage of light by an opaque body. The depth of a shadow depends upon the distance from the object upon which it is thrown, since the rays of light, by virtue of the properties of reflection, refraction, and dispersion, incline to bend around the opaque object; thus, an increase of the distance between the object and its shadow proportionately increases this action. Shadows also depend upon the intensity of light, as contrast is decidedly more marked in a strong than in a dim light. It is not infrequent to apply the term shadow to an interference of any kind of radiation, as sound shadow and electric shadow. A sound shadow is produced by any object that prevents the free passage of sound waves, as the interposition of a wall between the source of the sound waves and the ear. Electric shadows are produced in the same

way, but it must be borne in mind that interposed objects have a varying effect. For instance, glass forms no material obstruction to light, but interferes with the radiation of heat, while a stone or brick wall obstructs sound waves, but does not hinder the free passage of an electric current.

SHAEFFER, Nathan C., educator and writer, born in Maxatawny, Pa., in 1849. He studied in Franklin and Marshall College, after which he pursued advanced and special courses in the universities of Leipsic, Berlin, and Tübingen. After returning to his native State, he became principal of the Keystone State Normal School, in 1875, where he did much to advance professional training among the teachers. In 1893 he was elected State superintendent of public instruction, serving until 1909. In the meantime he was a member of the Commission of Industrial Education and held other important positions in educational associations. For some years he was editor of the Pennsylvania School Journal and of Bible Readings for Schools. He published "Education in Pennsylvania" and "Thinking and Learning to Think."

SHAFTER (shaft'er), William Rufus, general, born at Galesburg, Mich., Oct. 16, 1835; died Nov. 12, 1906. His father was a farmer and sent him to the public schools. He entered the Union army as lieutenant in 1861 and distinguished himself in the campaigns under McClellan in Virginia. In 1864 he was made colonel of volunteers, in 1865 was breveted brigadier general, and in 1886 entered the regular service. He was promoted to the rank of brigadier general in 1897 and put in command of the department of California, serving until the beginning of the Spanish-American War, when he was made major general of volunteers and commanded the first expedition to Cuba. In May, 1898, he proceeded to Tampa, Fla., and in June he landed with 16,000 men at Daiquiri, Cuba, whence he advanced toward the heights of El Caney and San Juan, and a few days later received the surrender of General Linares with an army of 20,000 men. Subsequent to the war he commanded the department of the East, but was transferred to the departments of California and the Columbia in 1899. He retired in 1901 with the rank of major general in the regular army

SHAFTESBURY (shafts'ber-ĭ), Anthony Ashley Cooper, statesman, born in Dorsetshire, England, July 22, 1621; died January 22, 1683. He studied at Exeter College, Oxford, and was elected to the Short Parliament in 1640. Though a supporter of the king, he joined the Parliamentary party, and became a member of the council of state under Cromwell in 1653. He soon opposed the Protector and favored the restoration of Charles II., who afterward made him Privy Counselor and later Chancellor of the Exchequer. In 1663 he was made a grantee of the Province of Carolina and became the

First Earl of Shaftesbury in 1672. Becoming unpopular with the court party, he was dismissed from the council. In 1681 he was imprisoned on a charge of high treason, but no true bill was found by the grand jury, hence he was acquitted. Later he fled to Holland on account of being implicated in treasonable plots. Dryden's "Absalom and Achitophel" is a satire on Shaftesbury, who is the Achitophel of this production. Ashley and Cooper rivers in South Carolina were named from him.

SHAG, the name frequently applied to several species of the cormorant. It has special reference to the bird which is known as the crested cormorant, which has a crest of feathers. See Cormorant.

SHAGREEN (shà-grēn'), a kind of leather or parchment prepared from the skins of horses, camels, and other animals. The skins are first cleared of the hair and scraped, after which they are stretched on a frame and covered with the seed of the goosefoot. After moistening and covering with a felt, pressure is applied to sink the seeds into the skins. Subsequently they are shaved down to the level of the depression thus made, and afterward the compressed parts are made to swell by soaking. Prepared in this way, the leather has a peculiar granular appearance, which is often imitated in a common style of bookbinding cloth. It is frequently dyed red with cochineal or green with sal ammoniac and copper filings. A kind of shagreen is made from the skins of various fishes covered with closely set papillae, such as the sharks, rays, and others. These skins are prepared like parchment and are finished by dyeing and smoothing. This class is used in making cases for spectacles, watches, cigars, and edged instruments.

SHAH JEHAN (shā je-hān'), the title assumed by Khorrum Shah, fifth Mogul Emperor of Delhi. The date of his birth is uncertain, but it is known that he was employed in military expeditions against the Mohammedan states of the Deccan in the reign of his father, and that he entered a rebellion against his father in 1623. On the death of the latter, in 1627, he at once ascended the throne. It may be said the empire had reached its greatest security at the time of his accession, but his reign was in the main successful, though warlike. After conquering the Deccan kings, he annexed the kingdom of Ahmadnagar in 1631, subjected Bijapur and Golconda in 1636, waged a long contest against the Uzbeks of Balkh, and made two unsuccessful attempts to expel the Persians from Kandahar. His reign became celebrated because of his remarkable sagacity, and he is remembered by many magnificent buildings that have been preserved to the present time. He is the founder of Delhi, where he caused the erection of the celebrated peacock throne, costing about \$34,500,000, built the Pearl Mosque and the Taj Mahal at Agra, and a number of other structures of great beauty. His son,

Aurungzebe, deposed him in 1658, and his death occurred in December, 1666.

SHAHJEHANPORE (shā-jū-hān'poor), or Shahjahanpur, a city of India, in the Northwest Provinces, 96 miles west of Lucknow, with which it is connected by railroads. It is situated on an imposing site near the Gurrah River, contains a number of stately mosques and castles, though these are largely in ruin, and is the center of a large export trade. An American Methodist mission station is located here, by which a number of schools and churches are maintained. Large quantities of sugar, cereals, and live stock are produced in the vicinity. The city was founded in 1647 by Shah Jehan, in whose honor it was named. Population, 1916, 78,963.

SHAKERS (shāk'erz), a communistic religious sect, whose official title is United Society of Believers in Christ's Second Appearing. It had its beginning in Manchester, England, where it was first advocated by Ann Lee. She married a blacksmith at an early age and had four children, who died in infancy, and it is perhaps due to this circumstance that she became an advocate of celibacy instead of the marriage state. Her first connection with ministerial work followed soon after coming in contact with Jane Wardlaw, the wife of a tailor, who professed to be a prophetess and that she had received a call to testify to and spread the truth. The Wardlaws were originally Quakers. Claiming a special revelation in regard to the second coming of Christ, they became estranged to some tenets of that faith and found an able advocate in Ann Lee.

The chief doctrine preached by these people was that the end of all things is near at hand, and that Christ would appear in the form of a woman and reign upon the earth. The meetings held in various parts of England attracted such crowds that the Wardlaws and Ann Lee were imprisoned, and, after being released, the latter claimed to have received the important revelation that she had been accepted as the female of Christ. Hence she became recognized as the head of the Shakers and was called Mother Lee. She claimed to be the bride of the Lamb and that she was the queen mentioned by David in the Psalms, but these pretensions were met with ridicule. Subsequently she claimed to have received a revelation to the effect that America was to be the foundation of the coming kingdom and that she and her followers should seek a home there. Accordingly she and seven disciples came to New York, and in 1774 made a settlement at Watervliet, near Albany. Subsequently many other settlements were made.

Among the chief tenets held at present by the Shakers is the dogma that the old law has been abolished and the new dispensation has begun. They believe that the Holy Ghost makes immediate revelations to mankind, that

the kingdom of God is now at hand and intercourse between earth and heaven has been restored, that man is freed from all errors except his own and the sin of Adam is atoned, and that heaven is in fact upon earth and will be brightened into its primeval state by labor and love. They hold several tenets in common with the Quakers and with them object to taking oaths, reject sacraments, and refrain from the complicated courtesies of society. Jesus Christ is regarded a divinely inspired man, representing the fatherhood of God, while Ann Lee was inspired to reveal to mankind the motherhood of God. Worship is conducted in churches, in which the worshippers step in uniform movements while singing hymns and listen to discourses on doctrine and duty. Celibacy is observed strictly. The society is recruited mostly by young men and girls, but married persons may join, who on entering are enjoined to live as brother and sister. The Shakers are noted for their industry, the men engaging in gardening, farming, building, and various arts, while the women attend to the work of education and household duties. All property is held in common and at present is valued at \$10,000,000. The organization has sixteen churches and a membership of 1,650 persons. The members are divided into about thirty families, ranging from five to one hundred persons in each, but the Mount Lebanon, N. Y., society is by far the most important. Most of the communities are in the New England states, but there are families of Shakers in Ohio, New York, Georgia, and Kentucky.

SHAKESPEARE (shāk'spēr), William, eminent poet and dramatist, born in Stratfordon-Avon, England, April 23, 1564 (N. S. May

3); died April 23, 1616. Though the most famous writer in English literature, his authentic biography is very brief. His parents, John Shakespeare and Mary Arden, daughter of Robert Arden of Wilmecote, had eight children, four sons



WILLIAM SHAKESPEARE.

and four daughters, of whom he was the third child. His father was high bailiff of Stratford, where William probably attended the grammar school, but his early education was necessarily limited, for the reason that his parents had little education and his father was obliged to take him out of school because of having failed financially. He was soon after apprenticed to a butcher, worked as a lawyer's clerk a short time, and in 1582 married Anna Hathaway, the daughter of a yeoman in the town of Shottery.

near Stratford. Shakespeare was then only eighteen years of age and his wife was eight years older, this fact being ascertained from the date on her tombstone. Three children were born to this union, a son and two daughters. Susanna was born in 1583. They had twins in 1585, the son being named Hamnet and the other daughter, Judith. The son died in his thirteenth year and the two daughters outlived their father.

Little is known of the early married life of Shakespeare and no definite reason has been assigned why he abruptly left Stratford in 1586 to take up his residence in London, but there is a legend that he and several young companions had at one time robbed the deer park of Sir Thomas Lucy of Charlecote. For this he was seized, brought before the esquire and punished, and in retaliation he wrote a satirical ballad and attached it to a gate of Charlecote. Matters were made decidedly worse by this conduct and Shakespeare sought refuge in London, where he earned his livelihood by holding horses at the doors of theaters, but his wit attracted the notice of actors and finally caused him to be employed as a player and dramatist. However, it is more probable that he developed considerable skill as a writer and formed the acquaintance of players from London, who visited Stratford, and was induced by them and by the necessity to provide for the support of his family to seek his fortune in the city.

He rose rapidly as a favorite member of the dramatic company, which was the most respectable and the most prosperous of that time. The most authentic account of his early success is secured from the attacks of disappointed rivals, the most noted being a pamphlet written by Robert Greene, in 1592, and soon after published by Henry Chettle. In this he was accused of weakness and plagiarism, but it provoked such criticism that Chettle made an apology for publishing it, using these words: "I am as sorry as if the originall fault beene my fault, because myself have seene his demeanor no less civill than his exclent in the quality he professes: besides, divers of worship have reported his uprightness of dealing which argues his honesty, and his felicitous grace in writing that approves his art."

Shakespeare is much more eminent as a playwright than as an actor, though he played successfully before the nobles and Queen Elizabeth, complimenting the latter in his "Midsummer Night's Dream." His first poetic production was published in 1593, entitled "Venus and Adonis," which he dedicated to Henry Wriothesly, Earl of Southampton, whom he called "the first heir of my invention." The following year he published the "Rape of Lucrece," and from that time his fame and fortune were assured. He soon became a shareholder in the theater, bought a substantial house for \$300 in 1597, and in 1602 purchased 107 acres of arable land at

Stratford for \$1,600. The acquisition of this and other valuable property brought him the style and title of William Shakespeare, Gentleman of Stratford-on-Avon, but it is certain that he did not leave the stage of London until after 1603, for in that year he occupied a place in the list of actors in Ben Jonson's play, entitled "Sejanus." He was a man of fine form and features, and enjoyed the intimate friendship of many eminent men of letters and high rank, among them Queen Elizabeth, James I., and Ben Jonson. His writings show a remarkable acquaintance with nature and human character, and have had a wide influence upon the English language. He stands as a central sun among the authors of England and his writings have been translated freely into many languages.

According to a popular story, but which was not mentioned until about fifty years after his death, the poet was visited by his friends Drayton and Ben Jonson. They met at a tavern in Stratford, where the three are said to have "drank too hard, for Shakespeare died of a feavour there contracted." The parish register states that the funeral of "Will Shakespeare, gent." occurred on April 25, 1616. He was buried in the chancel of the church in Stratford, where a slab bears the inscription:

Good friend for Jesus sake forbeare To digg the dust enclosed heare: Bleste be the man that spares these stones, And curst be he that moves my bones.

These lines are said to have been written by Shakespeare a short time before his death, but their authorship is not certain. However, they have prevented a removal of the remains to Westminster Abbey.

The writings of Shakespeare may be divided into three classes, historical, semi-historical, and fictitious. His historical productions include "Henry VI.," "Richard II.," "Richard III.," "King John," "Henry IV.," "Henry V.," and "Henry VIII." The semi-historical embrace "Titus Andronicus," "Hamlet," "King Lear," "Macbeth," "Julius Caesar," "Antony and Cleopatra," "Coriolanus," and "Cymbeline." Among his fictitious writings are "Love's Labor's Lost," "Comedy of Errors," "Two Gentlemen of Verona," "A Midsummer Night's Dream," "The Merchant of Venice," "Romeo and Juliet," "Much Ado About Nothing," "Twelfth-night," "As You Like It," "Taming of the Shrew," "Pericles," "Merry Wives of Windsor," "Measure for Measure," "All's Well that Ends Well," "Timon of Athens," "Troilus and Cressida," "Othello," "Winter's Tale," and "The Tempest."

SHALE, a class of rock, so named from its tendency to scale into thin sheets. These rocks were formed from sediments deposited by waters and afterward hardened, and are found in any age depositing silt that has not been disturbed by metamorphic action. A wide range is found in the color and composition of

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shale. Among the chief kinds are the calcareous, sandy, carbonaceous, and bituminous. The last mentioned yields naphtha, alum, paraffin, and other oils of importance commercially. Many finely preserved fossil remains are found in shales, especially those occurring with coal

deposits.

SHALER (shā'lēr), Nathaniel Southgate, geologist, born in Newport, Ky., Feb. 22, 1841; died April 10, 1906. He studied at the Lawrence Scientific School of Harvard University, in 1862, and joined the Union army for service in Kentucky. In 1864 he was made instructor of zoölogy and botany in the Lawrence Scientific School, but resigned to become professor of paleontology in Harvard University in 1867. This position he held until 1887, when he was made professor of geology. For some time he was director of the geological survey in Kentucky. His books include "Nature and Man in North America," "Aspects of the Earth," "A Study of the American Commonwealth," "The Interpretation of Nature," "Sea and Land," "The Individual: A Study of Life and Death," and "The United States of America."

SHALMANESER (shăl-mà-nē'zēr), the name of several kings of Assyria. Shalmaneser I., born about 1312 B. C., began to invade the western part of Asia and removed his capital from Asshur to Calah, south of the city of Nineveh. The second of these kings, Shalmaneser II., conquered the country as far as Lebanon. In 842 B. c. he made the Israelites, who were then governed by Jehu, tributary to Assyria. Shalmaneser IV. succeeded Tiglathpileser in 727 B. c. Hosea, King of Israel, refused to pay tribute to him in 725 B, C., hence he invaded and destroyed that state. Later he laid siege to Samaria for three years, after which it was captured and many of the treas-

ures were removed to his own capital.

SHAMANISM (shä'măn-ĭz'm), the religion of a large number of people in Asia and the eastern part of Europe, usually classed with idol worship. Though it has no fixed idols, it embraces a number of fetishes and ancestral images. The priest, known as the Shaman, has charge of certain ceremonies, such as sacrifices and incantations. These are practiced for the purpose of securing oracles and to purify the houses from defilement. The Shamanists believe in one God, whom they worship as the Supreme Being, and they hold to the view that the evil spirits of the lower world are sufficiently powerful to injure man, hence they regard it necessary to use magical rites and spells to avert their harmful influences. Shamanism is practiced most extensively in the northwestern part of Asia and the adherents consist chiefly of Tunguses, Turks, Finns, Hungarians, and Mongolians.

SHAMOKIN (sha-mō'kin), a borough of eastern Pennsylvania, in Northumberland County, about twelve miles south of Danville, on the Pennsylvania and the Philadelphia and Reading railroads. The surrounding country produces cereals, fruits, and anthracite coal. The noteworthy buildings include the public library, the high school, a parochial school, and many fine churches. Waterworks, electric rail-ways, and sanitary sewerage are among the improvements. Among the manufactures are powder, earthenware, machinery, cigars, and dairy products. It was platted in 1835 and incorporated in 1864. Population, 1910, 19,588.

SHAMROCK (shăm'rŏk), a plant bearing three leaflets, held memorable as the national emblem of Ireland. Some think it is the wood sorrel, but the white clover is the one more generally used. It is said that Saint Patrick selected a trefoil plant, that is, one having a three-parted leaf, to illustrate the doctrine of the Trinity, hence the shamrock was made the national emblem. The plant commonly sold in Dublin on Saint Patrick's Day, March 17, is the yellow trefoil. A green-colored imitation is sold on that festival in many cities of

SHAMYL (shăm'ĭl), or Schamyl, Samuel, military leader of the Caucasus tribes, born at Aul-Himry, in the Russian government of Daghestan, about 1797; died in Medina, Arabia, in March, 1871. After studying Arabian grammar and philosophy under the Mollah Jelaleddin, he became a leader of a Mohammedan sect and united a large Caucasian force against the Russians. The tribes of Daghestan soon recognized him as imam, or chief, and by skillful organization he succeeded in defeating a Russian army in 1837. His forces were defeated at the fortress of Akulgo and it was thought that he was among the slain, but he soon after reorganized and continued operations as a formidable opponent to the Russians until 1859, when he was surprised and captured on the plateau of Ghunib, where he had built a fort. The Russians carried him to Saint Petersburg, where he was treated kindly by the czar, who assigned him a residence at Kaluga and an annual pension of \$5,000. In 1870 he went on a pilgrimage to Mecca as a parole prisoner, but died the following year.

SHANGHAI (shăng-hā'i), a seaport city of China, on the Hwangpoo River, twelve miles from the mouth of the Yangtse-kiang. The city is divided into two parts, the Chinese city proper and the portion occupied by foreigners. Walls 24 feet high inclose the Chinese part of the city, which may be entered by six gates. Many of the streets are quite narrow and dirty, while the architecture is generally of an inferior kind. The part of the city occupied by foreigners lies north of the Chinese walls. It is well paved, is lighted by gas and electricity, and has numerous other modern facilities, including rapid transit. Many nationalities are represented in the part occupied by foreigners, but the majority are Italians, Americans, Ger2605 SHARK

mans, English, and French, and the government of this portion of the city is distinct from that of the Chinese part. It has a number of excellent buildings, including a fine cathedral, consular and municipal offices, hospitals, churches, and several educational institutions.

Shanghai has manufactures of clothing, wearing apparel, sailing vessels, earthenware, utensils, fans, and textiles. The harbor is safe and commodious, having many extensive quay improvements and dry docks. It has an immense interior and foreign trade in rice, silk, tea, cotton, hemp, wheat, paper, sugar, chemicals, fruit, oils, tobacco products, wool, metals, and opium. A large share of the export trade is transacted with America, Japan, Germany, Great Britain, France, and Russia. The total annual value of the export and import trade is about \$275,000,000. Shanghai dates from remote antiquity, but its importance as a trade center began in 1843, when it was opened as one of the five treaty ports and for unrestricted settlements. The first railroad of China was opened here in 1876, but it was soon after purchased and torn up by native authorities. Population, 1918, 655,580.

SHANNON (shăn'nŭn), the largest river in Ireland, which rises at the western base of the Cuilcagh Mountains, and after a southwesterly course of 250 miles enters the Atlantic Ocean.

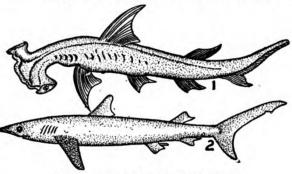
It flows through a number of loughs or lakes, among them Allen, Doburg, Bofin, Ree, and Derg, and from Limerick it forms a broad estuary 70 miles in length. The Shannon is navigable for large vessels to Limerick and for small craft as far as Athlone. It is connected with Dublin by two canals. Among its affluents are the Suck, Foyle, Fergus, and Brosna.

SHANS (shānz), or Laos, a group of native tribes occupying a region of Asia that lies between China, Siam, and Burmah, and who maintain a semiindependent form of government. The Shans and Laos are closely related to the

Siamese. They so nearly resemble each other that little distinction is usually made between them. They are early descendants from the Chinese, their ancestors having settled in the valley of the Irrawaddy about the 6th century. The region occupied by them is formed of numerous fertile valleys which contain productive fields and valuable forests, while the intervening ridges are noted for their deposits of petroleum, copper, coal, gold, silver, and other minerals. Their country embraces a number of states, which are governed by a chief and a council, the northern states being tributary to Burmah and the southern to Siam, but there is a considerable Shan population in the adjoining region of China. The people are skilled as manufacturers of jewelry, metalware, carpets, and various textiles. They carry on a considerable trade in these products, timber, and live stock. The Shans are quite industrious, giving marked attention to the cultivation of rice, sweet potatoes, the poppy, maize, melons, pepper, and fruits. They are adherents to the Buddhist faith. Serfdom is an extensive institution and slavery of a mild form exists in some of the states. Xieng Mai is the principal city and the chief center of political influence. The Shan population included in Siam is estimated at 1,500,000. Probably an equal number resides in China and Burmah.

SHARI (shā'rê), a river of Central Africa, the most important flowing into Lake Tchad. It rises north of the Congo Free State by several branches and, after a course of 700 miles toward the northwest, enters the lake by several mouths. The Shari flows through a region containing fine forests. In its vicinity are many wild animals, such as birds and hippopotami.

SHARK, an extensive genus of fishes of the ray family, found widely distributed in the ocean, but most abundantly within the tropics. The body is elongated in most species, the tail is thick and fleshy, and the teeth are generally large, sharp, and formed for cutting. The skin is scaleless, but usually is very rough with thornlike tubercles, and is used in making shagreen. They swim with great rapidity at



1, Hammerhead Shark; 2, Great Blue Shark.

long distances, often pursuing ships for the sake of securing the offal and waste materials thrown overboard. Some deep-sea species attain an enormous size and are noted for their voracity in devouring other forms of sea life. All species are more or less destructive of food fishes and do immense damage to the fisheries. The most powerful of the man-eating sharks is the white shark, or man-cater, of the warm seas. It is found in the waters off the southerly coasts of the United States, where it attains a length of forty feet. It scents food for some distance and is readily attracted by blood or decomposing bodies. Other large species of sharks are the tiger shark, the blue shark, the hammerhead shark, and the common dusky shark. The flesh of some species is eaten, the liver yields an oil, and the hide is serviceable in polishing fine-

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grained wood and in covering the hilts of swords to make the grasp firmer.

SHARON (shâr'ŭn), a borough of Pennsylvania, in Mercer County, on the Shenango River, 75 miles northwest of Pittsburg. It is on the Erie, the Pennsylvania, and the Lake Shore and Michigan Southern railroads. Large interests are vested in coal mining and iron manufacturing. The principal buildings include the high school, the public library, the Hall Institute, and the Saint Scholastica Academy. Among the products of the factories are flour, boilers, nails, lumber products, furnaces, and machinery. Sharon was settled in 1795 and incorporated in 1841. Population, 1910, 15,270.

SHARPSBURG (sharps'burg), a borough of Pennsylvania, in Allegheny County, five miles northeast of Pittsburg, on the Allegheny River. It has communication by the Pennsylvania and the Pittsburg and Western railroads and is surrounded by a productive coal and iron mining region. The manufactures include brick, glass, machinery, and lubricating oil. Electric lighting, waterworks, and a public library are among the public utilities. It has several fine public schools and churches. The region was first settled in 1826 and the borough, so named from James Sharp, was incorporated in 1841. Population, 1910, 8,153.

SHASTA (shas'ta), Mount, an elevated peak of California, near the northern boundary of the State in the Sierra Nevada Mountains. It has a height of 14,380 feet. Mount Shasta is an extinct volcano and has several craters, the largest of which is 2,500 feet deep and a mile in diameter. Other features include several glaciers, a number of hot springs, and an abun dance of snow at the summit. The lower slopes are well wooded.

SHAW, George Bernard, author and dramatist, born in Dublin, Ireland, July 26, 1856. He studied in his native city and re-



GEORGE BERNARD SHAW.

moved to London in 1876, after which he devoted his attention to literary work. His first writings consisted chiefly of criticisms of the fine arts, but he soon took up a journalistic career, engaged in politics as a Socialist, and became noted as a platform speaker. He contributed to the World and the Saturday Review, writing

many articles of interest on the drama for the latter periodical. Among the novels are "Love Among the Artists," "An Unsocial Socialist," and "The Irrational Knot." His plays include "The Admirable Bashville," "Man and Superman," "Three Plays for Puritans," and "Plays Pleasant and Unpleasant." Other writings of

interest are "The Quintessence of Ibsenism,"
"The Perfect Wagnerite," "Major Barbara,"
and "The Common Sense of Municipal
Trading."

SHAW, Henry Wheeler, humorist, best known as Josh Billings, born in Lanesboro, Mass., April 21, 1818; died in Monterey, Cal., Oct. 4, 1895. His father, Henry Shaw, was a member of Congress from 1818 to 1821 and after giving him the advantages of a common school education, he provided for his entrance into Hamilton College in 1832. The son soon left college to become a deck hand on an Ohio River steamboat, and afterward engaged in farming and as an auctioneer. He settled in Poughkeepsie, N. Y., in 1858, and the following year published his popular "Essay on the Mule" over the nom de plume Josh Billings. Soon after he went upon the platform as a lecturer, delivering his addresses in an awkward, backwoods dialect, which he also utilized in his writings. Among his published works are "Josh Billings' Farmers' Allminax," "Josh Billings on Ice," "Josh Billings' Spicebox," "Josh Billings, His Sayings," and "Josh Billings' Complete Works."

SHAW, Leslie Mortier, public man, born in Morristown, Vt., Nov. 2, 1848. After attending the public schools in his native State, he removed to Iowa, in 1869, and later graduated at Cornell College and at the law department of the University of Iowa. Soon after he built up a successful practice at Denison, Iowa, where he invested extensively in real estate and became interested in banking. In 1896 he was prominent as an advocate of the gold standard and the election of McKinley, and was elected Governor of Iowa the following year and reëlected in 1899. President Roosevelt made him Secretary of the Treasury in 1902 to succeed Lyman J. Gage, who resigned from the Cabinet in that year. He resigned from the Cabinet in 1908 to become engaged in large financial projects in New York City and elsewhere.

SHAWL, a garment or wrap worn as an outside covering of the person, generally used by women, but in some countries also by men, as among the Scotch Highlanders. Garments of this class have been used as apparel from remote antiquity, but they were not generally introduced until about the middle of the 16th century, when the celebrated cashmere shawls became an important article of commerce. They are usually made of a square of cloth or as a large, broad scarf, and the materials consist of wool, cotton, silk, hair, lace, or a mixture of fibers. Cashmere shawls made of the under wool of the cashmere goat of Tibet were the first worn in Europe, and their designs have been imitated in woven shawls. The cashmere shawls made in Tibet and India are often valued as high as \$1,500, the price being high because of the fine material used and the work being done with the greatest care by hand, some

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requiring six months or more for completion. At present there are extensive manufactories producing shawls in Canada and the United States, particularly at Lowell, Mass., and other cities of the eastern and middle states. They are an important product in many countries of

SHAWNEE (sha-ne'), a city of Oklahoma, in Pottawatomie County, 38 miles southeast of Oklahoma City. It is on the Missouri, Kansas and Texas, the Chicago, Rock Island and Pacific, and the Atchison, Topeka and Santa Fé railroads. The surrounding country is fertile, producing cereals, grasses, and fruits. Among the noteworthy buildings are the high school, the public library, and many churches and business houses. It has a large trade in live stock, grain, and merchandise. The industries include grain elevators, stock yards, cotton-seed oil mills, and machine shops. Population, 1907, 10,955; in 1910, 12,474.

SHAWNEES, an Indian tribe of North America; belonging to the Algonquin family. They were driven westward from New York by the Iroquois, but joined the French against the English, and later aided Pontiac until the peace of 1786. Subsequently they took part in the Miami War, but were reduced by General Wayne and concluded peace in 1795. In 1812 a part of the tribe joined the English, but later they moved to Missouri and finally to Kansas, whence a number entered Indian Territory; now Oklahoma, in 1854.

SHAYS (shāz), Daniel, leader of Shays' Rebellion, born in Hopkinton, Mass., in 1747; died in Sparta, N. Y., Sept. 29, 1825. He entered the continental army at the beginning of the Revolutionary War and attained to the rank of captain. After independence was secured, he became the leader of a party in Massachusetts that demanded redress from high taxes and public expenditures. In 1786 he was chosen to lead 1,000 insurgents, who appeared at Springfield to prevent the session of the supreme court, and the following year made an attempt to capture the continental arsenal. The State in the meantime raised a militia of 4,000 men under Gen. Benjamin Lincoln, which attacked Shays near Springfield on Jan. 25, 1787, and quickly routed his forces. Three insurgents were killed and one was wounded, while the main body fled to Amherst, where 150 were captured and the rest dispersed. A number were sentenced to be hanged, but later a general pardon was granted, and Shays received a pension in his old age for service rendered in the Revolution.

SHEAFFE, Sir Roger Hale, soldier, born in Boston, Mass., July 15, 1763; died July 17, 1851. He joined the British army in 1778 and subsequently removed to Canada as a Loyalist. In 1799 he entered the service in Holland, but soon returned to Canada, where he commanded the British forces at the Battle of Queenstown,

after the death of General Brock. For his efficient service in this engagement he was made a baronet. In 1813 he defended York (now Toronto) against the Americans and in 1828 was promoted to the rank of a general.

SHEARS, an instrument used for cutting various materials, such as cloth, cardboard, and metal. It consists of two blades, commonly with bevel edges and connected by a pivot, or has blades joined to a spring handle. Small instruments of this kind are usually called scissors and are intended for cutting thinner or finer substances. The wool is cut from sheep by means of shears. Instruments of this kind intended for cutting heavy rods or metal flakes are operated by steam or electric machinery.

SHEARWATER (shēr'wa-ter), or Hagden, a genus of web-footed birds of the petrel family, found widely distributed over the seas. They are about the size of a pigeon, have a brownish color above and white beneath, and are usually seen at no great distance from land, to which they resort only in the breeding season. A single white egg is laid in a hole under ground and the young are clothed with thick, long down. Among the different species are the sooty shearwater of the North Atlantic, the great shearwater of Greenland and Iceland, the manx shearwater of Western Europe, and the dusky shearwater native to the West Indies. The young are usually fat and considered a favorite food. The great shearwater is about 20 inches long and has an alar extent of 45 inches. It associates with the fulmars and in walking has the shambling movement of the duck.

SHEBOYGAN (she-boi'gan), a city in Wisconsin, the county seat of Sheboygan County, 50 miles north of Milwaukee. It occupies a fine site on Lake Michigan, near the mouth of the Sheboygan River, and has communication by the Chicago and Northwestern Railroad. Lines of steamboats communicate with the leading ports on the Great Lakes. Among the principal buildings are the county courthouse, the Federal building, the public library, the Saint Nicholas Hospital, the Sheboygan Home for the Friendless, an insane asylum, and Lutheran and Roman Catholic parochial schools. The manufactures include furniture, leather, flour, earthenware, lumber products, machinery, wagons, and shoes. It has a large wholesale trade in manufactures, lumber, fish, and agricultural products. The surrounding country is fertile, yielding cereals, grasses, and vegetables. It was settled in 1836 and incorporated as a city in 1853. Population, 1905, 24,026; in 1910, 26,398.

SHEEP, an important and useful class of ruminant animals, which are closely allied to the goat, but differ from it in having somewhat twisted horns with transverse ridges. The horns are hollow, and sometimes they are wanting in the females. They are destitute of a beard and the strong odor in the male goats.

Few animals possess greater value to man than do sheep, since their flesh is a nutritious food, the skin is useful for leather, parchment, and robes, the wool is of value in making staple clothing, and the milk is used for making butter and cheese in some countries. The flesh of the young is lamb, of the adult, mutton. The male sheep is called a ram, the female is designated a ewe, the young is termed a lamb, and a company is called a flock.

Sheep have been domesticated from remote

horns, and the *Iceland sheep* for having from three to five horns. Among the most valuable species are the *Astrachan* and *Circassian* sheep, which yield the famous Astrachan wool. The most extensive development of the sheep industry in the United States is in the arid regions of the West, but there are large interests in sheep rearing in New York, 14hio, Pennsylvania, and other central states. About 9,250,000 head are slaughtered annually in the United States. Ontario, New Brunswick, and Alberta have







MERINO RAM.

BLACKFACED HIGHLAND RAM.

CHEVIOT EWE.

antiquity, Abel being mentioned in Genesis as a keeper of flocks of sheep. It is impossible to ascertain whence the domestic stock came, since they were introduced into Western Europe before the historic period, but it is thought that their nativity is in the mountain regions of Asia. Wild sheep are essentially mountain animals, several species being still found in many sections of Central Asia and various parts of Africa, but animals of the wild stock are much smaller and have greatly inferior wools to the native and cultivated species. They are gregarious both in the wild and domesticated state. The ram is noted for its strong forehead, with which it is able to butt with considerable force against a foe.

Sheep culture was first introduced into America in 1609, and rapidly developed as an extensive industry, largely for the reason that sheep may be kept profitably on rough lands of little service except for pasturage, and because they are able to endure extremes of temperature. The ewe frequently brings forth twins, but usually only one at a birth, and the lambing season occurs generally in the early spring. About 90 per cent. of the sheep reared in the United States are Merinos, this grade being noted for its silky and fine wool. It was first introduced from Spain in 1801. Other grades of sheep include the Southdown, Shropshire, Cheviot, Delaine, Dorset horn, Leicester, Hampshire down, Lincoln, Cotswold, Rambouillet, Silesian, and Saxon. The broad-tail sheep of Asia is remarkable for its large tail, which often weighs from seventy to eighty pounds, and is considered a great delicacy for food It is protected by the shepherd, who attaches to it a small board on rough wheels to prevent it from being injured by dragging on the ground. The Wallachian sheep is noted for the size of its

large interests in rearing sheep. The number of head in Canada is reported at 2,750,500. Australia, Central Asia, and various parts of Europe are among the principal sheep-growing regions of foreign countries. See Wool.

SHEPSHEAD, a spiny-rayed food fish common to the Atlantic coast of North America. It is so named from the shape and color of its head, is highly esteemed for the table, and is caught by nets. The size is from twenty to thirty inches and the weight ranges from eight to ten pounds. The food of the sheepshead consists of shellfish and crustaceans, which it crushes with its teeth. Among the allied species are the butterfish, the moonfish, and the freshwater drum. The moonfish has a light gray color, a short and thick body, and a length of about twenty inches. It is caught chiefly in nets, since it is skilled in biting off the line with its sharp incisors.

SHEEPTICK, an insect belonging to the family of horse flies, often troublesome to sheep. It is wingless, has a flattened body and a long proboscis and broad head, and is parasitic on the body of sheep. The female attaches its eggs to the wool of the sheep, from which the young develop in a short time. They soon begin to extract blood by fixing the head in the skin of the sheep, often forming a large tumor. These pests are destroyed by dipping the sheep into various poisonous solutions. Sheep louse is another name for the same insect.

SHEFFIELD (shef'feld), a city of England, in Yorkshire, at the confluence of the Don and Sheaf rivers, 145 miles northwest of London. It is important as a railroad junction, has regularly platted and well-improved streets, and occupies an imposing site. Sheffield has extensive canal connections; the Don River was made navigable as early as 1751. Among the

notable buildings is the Church of Saint Peter, dating from the reign of Henry I., Saint Mary's Church, Saint George's Museum, Wesley College, Firth College, Ranmoor College, and the Church of England Educational Institute. The city is beautified by many fine monuments, statues, and gardens. It has a large number of public schools, numerous hospitals and charitable institutions, and many institutes devoted to arts, sciences, and secondary learning. Among the manufactures are cotton textiles, woolen and silk goods, vehicles, buttons, hardware, cutlery, armor plate, railroad supplies, and engines. The most noted manufactured products are different forms of cutlery, these having existed in the city since 1620, when Cutler's Company was organized.

Sheffield was founded by the Saxons, but its site had been used as a Roman station for many years. Edward I. granted a charter in 1296. Chaucer mentions the town as an important center for the manufacture of cutlery. Mary, Queen of Scots, was imprisoned for fourteen years in the castle maintained in the time of Queen Elizabeth, when the castle was known as the Sheffield Manor house. However, its importance as a trade and manufacturing center dates only from the early part of the last century, being greatly augmented by the building of railroads and other improvements. It was chartered as a city in 1893. Five members represent it in Parliament. Population, 1911, 454,653

SHEIK (shēk), meaning the eldest, the title of the chief of an Arab tribe and of various dignitaries among the Mohammedans. It has special reference to the heads of monasteries and to the higher order of religious preachers, as the mufti of Constantinople, who is sometimes called Sheik ul-Ismal, which signifies chief of the true believers. Many sheiks claim a long line of ancestors, including the sheik of Mecca, who receives presents from caravans in consideration of his supposed descent from Mohammed.

SHEKEL (shěk"l), the Hebrew unit of weight and of money. It was probably equal to about half an ounce avoirdupois, or about 218 grains. The value of the silver shekel is usually stated to have been from 50 to 60 cents, while the golden shekel was of half this weight and had a value of \$4.55. Both as money and as a weight the shekel was divided into the beha, reba, and gerah, valued respectively one-half, one-fourth, and one-twentieth of a shekel.

SHELBY, Isaac, pioneer and soldier, born in North Mountain, Md., December 11, 1750; died July 18, 1826. His father engaged in the cattle business in Tennessee, where his family removed soon after, and Isaac engaged in the border Indian war. He entered the colonial army at the beginning of the Revolution, and distinguished himself at the Battle of Long Island Flats, Tennessee, with the Indians in

1776. Subsequently he assisted in capturing the British stores at Chickamauga, took part in the Battle of King's Mountain, and served as Governor of Kentucky from 1792 to 1796, and again from 1812 to 1816. In the War of 1812 he organized a body of 4,000 volunteers and joined General Harrison in Canada, taking part in the victory of the Thames. Congress voted him a gold medal for this service.

SHELBYVILLE (shěl'bĭ-vĭl), a city in Indiana, county seat of Shelby County, on the Big Blue River, 25 miles southeast of Indianapolis It is on the Pittsburg, Cincinnati, Chicago and Saint Louis, and the Cleveland, Cincinnati, Chicago and Saint Louis railroads, and is surrounded by a fertile farming and dairying country. The notable buildings include the county courthouse, the public library, the city hall, the high school, and many churches. Forest Hill Cemetery is a fine burial ground. Among the manufactures are flour, ice, carriages, tobacco products, bicycles, machinery, and furniture. Natural gas is obtained in its vicinity. It has a large trade in farm produce and merchandise. Population, 1900, 7,169; in 1910, 9,500.

SHELDON (shěľdun), Charles Monroe, author and clergyman, born in Wellsville, N. Y., February 26, 1857. His early life was spent on a farm in Dakota, and he afterward studied at Brown University and Andover Theological Seminary. He went to London in 1886 to study the conditions of the poorer classes, and two years later became pastor of the Central Congregational Church at Topeka, Kan. His books have had a very large sale, especially the one entitled "In His Steps," which was written from the view of the question, "What would Jesus It has been translated into German, Spanish, French, Swedish, Norwegian, Russian, Italian, Armenian, and many other languages. Other publications include "Richard Brice," "Twentieth Door," "King's Question Book," "Crucifixion of Philip Strong," "His Brother's Keeper," "Malcolm Kirk," "Redemption of Freetown," "For Christ and the Church," and "The Heart of the World."

SHELDON, Edward Austin, educator, born at Perry Center, N. Y., Oct. 4, 1823; died in 1897. He studied at Hamilton College, and in 1851 became superintendent of schools at Syracuse and subsequently at Oswego. In 1862 he was made principal of the Oswego State Normal and Training School. He exercised a wide influence upon educational work in the United States by introducing the methods of teaching known as *object lessons*. His publications include "Lessons on Objects" and "Manual of Elementary Instruction."

SHELDRAKE (shěľ/drāk), the common name of a class of ducks usually regarded a connecting link between geese and ducks. They are native to the Eastern Hemisphere. The head and neck are dark glossy-green with a white collar beneath, and under this is a chestnut

color that extends over the upper part of the The rest of the plumage is white with black and greenish markings. They frequent sandy coasts, breeding in a burrow, often that of



SHELDRAKE.

the rabbit. They lay about twelve or fourteen eggs, which are nutritious food. The sexes are quite alike in plumage, but the male is somewhat the larger. These ducks, though quite shy, are capable of being domesticated. Large numbers are hunted

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for their eggs and down in the Black, Caspian, Mediterranean, and other seas. Besides the common sheldrake, there are the ruddy sheldrake of Barbary and the chestnut sheldrake of Australia. An allied species common to the United States is sometimes called sheldrake, but it is more properly a red merganser.

SHELL, the hard covering of many invertebrate animals. It serves to encase the soft and vulnerable bodies of certain invertebrates. but the term is also applied to the covering of some part of it and to the outer envelope of an egg. Many classes of shells occur in the animal kingdom, varying in size from minute microscopic organisms to large formations weighing 500 pounds. All shells possess a more or less distinct organic structure, which in some animals resembles true skin, while in others it is quite like the epidermis of the higher animals. The shells of many groups of mollusks differ so materially that it is often possible to determine the family, and in some cases even the species, by examining small fragments of their shells, this being true both in fossil and recent specimens. Their composition consists usually of calcium carbonate and albumen, and the shell formation gradually thickens by the addition of successive layers as the animal grows from infancy to maturity.

Shells are known as porcelain or pearly, according to their constituency. Those having more lime than albumen form the hard porcelain shells, while those having consecutive layers of albumen and lime constitute pearly shells, so called from their resemblance to mother-of-pearl. The two classes as to form include the univalve and bivalve shells. Univalves are those which have only one part, such as the shells of snails; bivalves are formed of two parts joined together by a hinge, like those of the clam and oyster. Many forms are included in both classes, but bivalves are largely pearly shells and univalves are mostly porcelain. Shells are useful for many purposes, among them for ornaments, buttons, and handles for edged tools. In some countries they are burned into lime and used for fertilizing land.

SHELL, a hollow metallic projectile filled

with an explosive, which is fired either by a time fuse or by percussion. Shells were first invented in 1480, when they were made largely of cast iron and fired as bombs from mortars, and as such were successfully employed by the Turks at the siege of Rhodes in 1522. came into general use by the middle of the 17th century, but since then many new and useful improvements have been made. Those of cast iron, intended for mortars and smoothbore cannon, are spherical in form, but elongated and cylindrical shells are generally used in rifled guns. When fired from a rifled gun, they take a rotary motion from the grooves, thus insuring truer carriage. The common shell is a hollow projectile charged with powder and used to destroy masonry and earthworks, but Shrapnel shells, so named for the inventor, contain bullets and fragments of iron in addition to a charge, and when set on fire release the contents with great destruction. Various modifications of these two classes are made, such as segment shells, containing iron segments and powder, and carcases, containing material designed to set on fire the buildings or objects against which they are thrown.

SHELLEY (shěl'lĭ), Percy Bysshe, noted poet, born in Sussex, England, Aug. 4, 1792; died July 8, 1822. He was the eldest son of

Sir Thomas Shelley, a man of wealthy and ancient parentage, and studied at Eton and Oxford University. His first work as an author undertaken at Eton, where he joined a fellow student in writing two romances, but soon left that institu-



PERCY B. SHELLEY.

tion because he fancied the government savored of tyranny. At Oxford he experienced like unpleasantness, and as a consequence filled his mind with atheistic arguments. In 1811 he published a tract entitled "Necessity of Atheism," for which he was expelled from the university, and shortly after married Harriet Westbrook, a girl of inferior rank, which caused his family to renounce him. This union proved unhappy. His wife with two children returned to her father's house, in 1814, and two years later ended her sad life by drowning. He had previous to this made an extended tour through France, Germany, and Switzerland in company with Mary Godwin and a relative, Miss Clairmont, and shortly after the death of his wife married the former. The delicate state of his health rendered it necessary that he should leave England for a warmer climate, and the remainder of his life was spent abroad, with only one short interruption.

While in Switzerland Shelley formed the acquaintance of Byron, upon whom he exerted a powerful influence, and ever after kept up an intimate acquaintance with him. Shortly after he settled at Rome, where many of his finest productions were composed. Boating had always been a passion with him, and it was especially convenient to take trips to Naples, Florence, Pisa, and other points of interest. His friends included, besides Byron, Leigh Hunt, Trelawny, and a number of other eminent writers. His death resulted while returning with a friend from Leghorn in a small yacht, which was caught in a wind and stranded in the Gulf of Spezia, and both were drowned. His body was washed ashore and, according to the quarantine laws of Tuscany, was burned. The ashes were deposited in the Protestant cemetery at Rome by Byron.

Shelley was gifted with genius of a high order, possessed richness and fertility of imagination, and was energetic in the reproduction of his conceptions. No English poet has surpassed him in the command of all the resources of metrical harmony. His early literary life was somewhat clouded by financial straits, but the death of his grandfather gave him a fixed income and a fine estate near Windsor Forest. His numerous writings include "Queen Mab," "Alastor, or the Spirit of Solitude," "Revolt of Islam," "Witch of Atlas," "Prometheus Bound," "Rosalind and Helen," "Sensitive Plant," "Ode to a Lark," "The Skylark," "The Cenci," and "Hellas."

SHELL-LAC (shěl'lak). See Lac.

SHENANDOAH (shen-an-do'a), a borough of Pennsylvania, in Schuylkill County, 138 miles northwest of Philadelphia. It is on the Lehigh, the Pennsylvania, and the Philadelphia and Reading railroads. The anthracite coal region in the vicinity produces annually about 1,500,000 tons. The notable buildings include the public library, the high school, the townhall, the Greek Catholic church, and many fine churches. Among the manufactures are machinery, utensils, spirituous liquors, hats and caps, hardware, and vehicles. It has sanitary sewerage, public waterworks, and electric street railways. The place was platted in 1862 and incorporated in 1866. Population, 1900, 20,321; in 1910, 25,774.

SHENANDOAH, a river of Virginia, which rises by two branches in Augusta County and flows toward the northeast, joining the Potomac at Harper's Ferry. The Shenandoah valley lies between the Blue Ridge and the Alleghenies, and is one of the richest sections of the State. The river has a total length of 170 miles and is navigable for a hundred miles from its mouth. Many notable events occurred in the valley of the Shenandoah during the Civil War. General Sherman devastated it in 1864.

SHEOL (shē'ōl), a word used frequently in

the Old Testament and by some writers, being equivalent to the word hell, or the Hades in classical Greek literature. The words pit, grave, and hell take its place in the Revised Version of the Bible, but the last term is used only once. Sheol signifies a cave or tomb for the departed spirits. See Hades.

SHEPHERD DOG, a breed of dogs, usually classed with the wolf species. The size is medium, the tail is long and bushy, and the muzzle is quite sharp. Dogs of this breed are noted for their bright eyes and high grade of intelligence. They may be trained to watch and drive flocks and herds without being accompanied by the master. Dogs of this class are used extensively to attend sheep in mountainous countries, and are ropular as farm dogs to drive cattle. The Scotch collie is a celebrated species of this breed.

SHEPHERD'S PURSE, a widely distributed weed of the Temperate zones, where it prevails in abundance along roadsides and in fields and pastures. The plant is an annual, has simple leaves and small white flowers, and bears its seed in a pod resembling a purse, hence its

SHERBROOKE (sher'brook), a city in Quebec, capital of Sherbrooke County, eighty miles east of Montreal, at the confluence of the Magog and Saint Francis rivers. It is on the Canadian Pacific, the Grand Trunk, the Quebec Central, and the Boston and Maine railways. The principal buildings include the county courthouse, the public library, the post office, the high school, and the Eastern Township Bank. It has manufactures of woolen goods, flour, cigars, hardware, clothing, and lumber products. In the vicinity are iron, asbestos, copper, and chrome deposits. It has a large trade in lumber, paper pulp, asbestos, minerals, and merchandise. A large proportion of the inhabitants are French-Canadians. Population, 1911, 16,405.

SHERE ALI, Ameer of Afghanistan, born in 1825; died Feb. 21, 1879. He succeeded his father, Dost Mohammed, as Ameer in 1863. Several rivals contended for the throne, owing to his apparent willingness to adopt European customs, but he became fully established as supreme ruler in 1869. He agreed to the establishment of the Russian embassy in Kabul, but refused to permit the same privilege to the British, hence the latter invaded the country in 1878. Shere Ali left Afghanistan to take refuge in Turkestan, where he died.

SHERIDAN (sher'i-dan), a city of Wyoming, county seat of Sheridan County, 175 miles northwest of Newcastle, on the Chicago, Burlington and Quincy Railway. It is surrounded by a fertile farming and coal-mining region and has a large trade in merchandise and live stock. The principal buildings include those of the county, the high school, and a college. It has manufactures of brick, clothing and farm machinery. Population, 1910, 8,408.

SHERIDAN, Philip Henry, eminent military leader, born in Albany, N. Y., March 6, 1831; died at Nonquitt, Mass., Aug. 5, 1888.



PHILIP H. SHERIDAN.

His parents came from Ireland and settled in Albany a short time before his birth. but soon after removed to Ohio, where he attended the public schools. He graduated from the West Point Military Academy in

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Subsequently he did military duty in various portions of the country, and entered the Union army in 1861 with the rank of captain. After serving as quartermaster of the army of southwestern Missouri and chief quartermaster of Halleck's army in Mississippi, he was promoted colonel of the Second Michigan cavalry in 1862. He defeated a superior cavalry force at Booneville, and soon after was made general of volunteers. In the same year he displayed remarkable ability in rallying the Union forces at Perryville. On Jan. 2 and 3, 1863, he commanded the left division of the right wing of the Union army at Stone River, his efficient services in outflanking General Bragg being rewarded by promotion to the rank of major general. He next fought at Chickamauga and Missionary Ridge. At the latter engagement he attracted the attention of General Grant by his combination of dash and judgment, and the latter soon after gave him command of the cavalry of the army of the Potomac. In that capacity he dis-tinguished himself in the Battle of the Wilderness on May 5-6, 1864, gaining by his continued success an appointment to the command of the army of the Shenandoah. Later he was assigned the task of clearing the northwestern part of Virginia, from which the Confederate forces continually threatened Washington. General Early had command of the Confederate forces at Winchester, where he was defeated by Sheridan in September, and shortly after at Fisher's Hill, the latter taking about 5,000 prisoners in the two battles.

On Oct. 19, 1864, the Confederates surprised and routed Sheridan's army at Cedar Creek. At that time Sheridan was on his way back from Washington and, hearing the noise of battle twenty miles away, at Winchester, he rode hastily to the contest and turned defeat into victory by waving his hat and shouting: the other way, boys; we are going back." He was soon after made major general in the regular army, and Congress voted him the thanks of the nation. In 1865 he joined General Grant and subsequently accompanied the army of the

Potomac until the close of the war, assisting in the operations before Petersburg and the final surrender of General Lee at Appomattox. He commanded the department of the gulf from 1866 to 1867 and of the Missouri from 1867 to 1868, was made lieutenant general in 1869, and became general in 1888. In 1870 he witnessed the leading battles and maneuvers of the Franco-German War. He was modest, and could be relied upon to manage efficiently important commands, while his boldness, dash, foresight, and judgment were alike admirable. Grant compared him with Napoleon and Frederick the Great, and Archibald Forbes regarded his magnetism and genius for war equal to that Skobeleff. He wrote his "Personal Memoirs," which appeared in two volumes after his death. James E. Kelly made a fine statuette of him, known as "Sheridan's Ride," and he has been otherwise fittingly honored.

SHERIDAN, Richard Brinsley Butler, orator and dramatist, born in Dublin, Ireland, Sept. 30, 1751; died July 7, 1816. He was a son of Thomas Sheridan (1721-1788), an efficient actor and later teacher of elocution, and received his early education in a school of his native town. In 1763 he was sent to study at Harrow, where he joined a schoolmate in writing a farce entitled "Jupiter." In 1773 he married Miss Linley, an accomplished musician of Bath, and shortly after settled in London to engage in literary work. He soon became part proprietor of the Drury Lane Theater, where his "The Rivals" and the "School for Scandal" attracted wide attention. In 1780 he entered Parliament for Stafford.

Sheridan became Undersecretary for Foreign Affairs in 1782, and the following year Secretary of the Treasury. His speeches in Parliament are regarded among the finest delivered in that body, being noted for their oratorical style and persuasive reasoning. The most noted were the three great orations delivered while the proposal to impeach Warren Hastings was In 1794 he made a remarkable address on the "French Revolution," which has been widely read. His parliamentary career ended in 1812, after serving in that body 32 years, but when retiring from public service his property had been spent and he had lost his former friends. At least a part of his financial difficulties was due to extravagant living. He suffered a considerable loss when Drury Lane Theater burned in 1809, and at one time was imprisoned for debt. He was buried in Westminster Abbev.

SHERIFF (sher'if), the chief administrative officer of a county, both in Great Britain and the United States. The duties relate to the execution of civil and criminal processes. They include the maintenance of peace and order and the attendance upon courts as administrative officer. In most cases the sheriff is elected by direct vote of the people, but in some instances this officer is appointed. He is required to give a bond for the faithful performance of his duties. In the more populous counties he has one or more deputies, for whose official acts he is civilly liable. The sheriff originally exercised judicial authority in England and Scotland, where he presided over the common-law county court, and twice a year he made a circuit to the subdivisions of his shire, known as the sheriff's tour.

SHERMAN (sher'man), a city in Texas, county seat of Grayson County, 65 miles north of Dallas and 12 miles south of the Red River. Communication is furnished by the Missouri, Kansas and Texas, the Texas and Pacific, the Atchison, Topeka and Santa Fé, and other railroads. It is surrounded by a rich cotton, grain, and live-stock country. The manufactures include flour, cotton-seed oil, cordage, furniture, tobacco products, vehicles, ice, brooms, machinery, and farming implements. It has electric lights and street railways, public waterworks, pavements, and numerous schools and churches. Sherman is the seat of Austin College, Sherman Institute, North Texas Female College, Saint Joseph's Academy, and several other institutions of learning. It has a fine courthouse, built of brick and stone. The place was settled in 1848 and incorporated in 1895. Population, 1900, 10,243; in 1910, 12,412.

SHERMAN, James Schoolcraft, statesman, born at Utica, N. Y., Oct. 24, 1855. He studied at Hamilton College, where he graduated in 1878, and two years later was admitted to the After being mayor of Utica, he was elected to Congress, in 1886, in which he served continuously until 1909, except for the period from 1891 until 1893. He was elected Vice President of the United States in 1908, on the Republican ticket with William H. Taft. During the campaign the New York World charged him with having promoted a company to control certain public lands in New Mexico, the design being to acquire them at about one-tenth of their value, but it was shown that the project was abandoned because the land could not be secured without violating the law. He died Oct. 30, 1912.

SHERMAN, John, statesman, born in Lancaster, Ohio, May 10, 1823; died Oct. 22, 1900. His father died in 1829, leaving a large family, and he was soon after adopted by a relative who resided at Mount Vernon. A sister provided the means for his education in a school at Lancaster, and he afterward studied law at Mansfield in the office of his brother, C. T. Sherman. In 1844 he obtained admission to the bar, and entered upon a successful practice in Mansfield, where he married a daughter of James Stewart in 1848. In 1854 he was elected to Congress as a candidate of the Free-Soil party, and he was reëlected two succeeding terms. He served on a number of important committees, and attained recognition as one of the foremost members in the lower house.

Sherman was again elected to Congress in 1860, but was chosen to the United States Senate in 1861, serving continuously in that body until in March, 1877, when he was appointed Secretary of the Treasury by President Hayes, a position he held until the close of that administration, in 1881. In the latter year he was again elected to the Senate, and was reëlected in 1887 and in 1893. President McKinley appointed him Secretary of State in 1897, a position he held until in April, 1898, when he retired from public life, and was succeeded by William R. Day in the Cabinet. The name of John Sherman is inseparably connected with the history of American finance and politics. Besides being prominent as a speaker on the floor of Congress and in committees, he exercised a wide influence on the policy of the government. One of the most noted financial measures enacted while he was Secretary of the Treasury is the resumption of specie payments in 1879. He wrote "Recollections of Forty Years in the House, Senate, and Cabinet," and published "Selected Speeches and Reports on Finance and Taxation, 1859-1878."

SHERMAN, Roger, statesman and signer of the Declaration of Independence, born in Newton, Mass., April 19, 1721; died in New Haven, Conn., July 23, 1793. He learned the trade of a shoemaker while a boy and followed it as a business until 1743, when he entered a store at New Milford, Conn., and was chosen county surveyor in 1745. After studying law, he was admitted to the bar in 1754, and became a member of the Legislature and later a judge of common pleas. In 1774 he was selected a member of the Continental Congress, where he served on the committee to draft a declaration of independence, and subsequently aided in framing the Articles of Confederation and the Federal Constitution. He was elected to the Senate in 1791, but died two years later. Other positions of importance held by him include membership in the Connecticut Legislature for nineteen years, treasurer of Yale University from 1766 to 1776, and mayor of New Haven from 1784 to 1793.

SHERMAN, William Tecumseh, distinguished general, born in Lancaster, Ohio, Feb. 8, 1820; died in New York City, Feb. 14, 1891. He was a brother of John Sherman, and on the death of his father, in 1829, was adopted by Thomas Ewing, who provided for his education in the Lancaster Academy and afterward procured his appointment as cadet at the West Point Military Academy. In 1840 he graduated the sixth in rank of his class and secured an appointment to the artillery. He served against the Seminoles in Florida from 1840 to 1842, was stationed at Fort Moultrie, South Carolina, until 1846, and subsequently served as adjutant general during the Mexican war. He married Ellen Boyle Ewing, daughter of Thomas Ewing, in 1850, and three years later

resigned his commission in the army to become manager of a bank in San Francisco. Sherman, having begun the study of law in 1843, was ulti-



WILLIAM T. SHERMAN.

mately admitted to the bar. In 1858 he began the practice of law in Leavenworth, Kan., but was made superintendent of the military academy at Alexandria, La., the following year. When that State seceded from the Union, he promptly resigned, and

was appointed colonel in the United States army with a command under General McDowell.

Sherman had command of a brigade in the First Battle of Bull Run. He was made brigadier general soon after and was assigned to the department of the Cumberland, of which he was given command on Oct. 8, 1861. Sherman was among the first to represent to the Secretary of War that it was necessary to secure 60,000 men for the defense of Kentucky and 200,000 to conduct successful operations against the enemy, but many held the view that the war would be of short duration, and characterized his judgment as unsound. General Buell superseded him in November, and he was ordered to report to General Halleck, under whom he received command of a camp of instruction near Saint Louis. Later he formed a division for himself, and in the Battle of Shiloh, on April 6, 1862, won favorable mention by Grant and Halleck for distinguished services. He was made major general of volunteers soon after, and exercised a large influence in the operations under Grant around Vicksburg and Memphis. The first attack on Vicksburg was made in December, 1862, but Grant's supplies were captured at Holly Springs, thus giving the enemy time to reinforce the city, and Sherman found it impossible to successfully assail that stronghold with the inadequate force at his disposal. However, he was joined by General McClernand in storming Arkansas Post, where they captured 7,000 prisoners, and in 1863 he bore the brunt of the battle at Chattanooga.

When Grant became commander in chief of the forces in March, 1864, Sherman was put in command of the military division of the Mississippi and was ordered to advance upon Atlanta against Gen. Joseph E. Johnston. That stronghold was occupied on Sept. 1, but involved a month and a half of fighting, including the battles of Dalton, Resaca, New Hope Church, and Kenesaw Mountain. Soon after he started upon his famous march to the sea with 70,000 men, and, after defeating the enemy at Fort McAllister on Dec. 21, entered Savannah. A month

later he started on his march northward through the Carolinas to support General Grant, but, on hearing the news of the surrender of General Lee, General Johnston sent to Sherman for terms of peace, and surrendered at Durham's Station, N. C., on April 26, 1865. Sherman was given command of the division of the Mississippi after the war. He was made lieutenant general in 1866, and President Grant, in 1869, raised him to the rank of general, with headquarters in Washington. He made a tour of Europe from 1871 to 1872, and was placed on the retired list on Feb. 8, 1884. Though given numerous opportunities to fill political offices, he constantly refused. He ranks among the most eminent military leaders of America, being characterized by promptness in execution and fearlessness in confronting danger, yet strengthened by remarkable soundness of judgment. His influence over the soldiers was always for the common good, and his popularity among those subordinate to him was conceded from the first. He wrote "Personal Memoirs."

SHERRY (sher'ry). See Wine.

SHERWOOD (sher'wood), William Hall, musician, born in Lyons, N. Y., Jan. 31, 1854. He studied at the Lyons Musical Academy, which was founded by his father, and subsequently received musical training in Berlin and Weimar, Germany. While in the latter city he was instructed by Liszt. On returning to America, he became a teacher in the New England Conservatory, and in 1889 removed to Chicago, where he founded the Sherwood Piano School. He played successfully in the principal cities of Europe, Canada, and the United States, and is the only American ever invited to take part with the leading orchestras of Germany. His compositions consist chiefly of high-grade music for the piano. He published "Music Study and Interpretative Technique."

SHERWOOD FOREST, a hilly region of England, in Nottinghamshire. Formerly fine forests covered the region, which is about twenty-five miles long and seven miles wide, but it is now largely cleared and occupied by farms, gardens, and pastures. Sherwood Forest is the region where Robin Hood and his followers

enacted many marauding exploits.

SHETLAND (shet'land), an island group north of Scotland, situated about fifty miles northeast of the Orkney Islands, forming a county of Scotland. About 100 islands are included in the group. All are more or less rocky, with precipitous shores in many places. They have an area of 325 square miles. The three chief islands are Mainland, Yell, and Unst, but 26 others are inhabited. Dry and extreme cold characterize the winter, when the days are only a few hours long, but the summers are warm and moist. The total population of the group is 28,695. Lerwick is the principal town and seaport. It has the public offices, law courts, a customhouse, and a population of 4,154.

Native timber is not found in the islands, but forestry is promoted. Fishing is the principal industry. Considerable interests are vested in rearing cattle, horses, sheep, and poultry. The soil products include oats, turnips, hay, potatoes, and garden vegetables. Among the chief exports are salted fish, sheep, eggs, and cattle. The islands are particularly famous for the rearing of Shetland ponies. Deposits of iron, copper, sulphur, and sandstone abound. The manufactures include woolen goods, fishing supplies, fish oil, cured fish, and utensils. These islands were known to the Romans as the Ultima Thule, and long formed a possession of Scandinavia. The people still speak a dialect largely mixed with Norse words. They are a sober, intelligent, and industrious class.

SHIBBOLETH (shǐb'bō-lĕth), a test word mentioned in Judges xii., 6. It was used as a criterion by Jephthah and the Gileadites to test the Ephraimites after their victory over the latter. The Ephraimites were easily known by omitting the sound of sh, and pronouncing the word sibboleth instead. It is still used in several modern tongues to test the speech and manners of certain social classes.

SHIELDS (shēldz), South, a city in England, at the mouth of the Tyne River, eight miles northeast of Newcastle-on-the-Tyne. Opposite the city are North Shields and Tynemouth, with which it is connected by steam ferry. It has railroad and steamboat facilities, and an extensive trade in coal, earthenware, and food stuffs. Among the noteworthy buildings are the townhall, the public library, the marine school, and the public museum. The manufactures include cordage, sailing vessels, anchors, earthenware, chemicals, glass, steamboilers, and The harbor is protected by an exmachinery. tensive breakwater and has large docks for repairing ships. A military post was established on its site by the Romans, but its prosperity dates from the development of its salt works in 1489, and its modern enterprise from the building of railroads in the middle of the last century. Population, 1911, 108,649.

SHIITES (shē'īts), a denomination of the Mohammedan religion, constituting the most numerous branch in Islam. They reject the Sunna, the law held by the Sunnites, and are followers of Ali, the son-in-law of Mohammed, whom they look upon as the first lawful successor of the Prophet. Persia is the only nation in which the Shiites predominate, but they are quite numerous in India, the southern part of Arabia, and among the Tartars. In practice they are superstitious, and their ministers are of the dervish type. They are inclined to separate religion from ethics, and are less orthodox than the Sunnites, but the two sects stand together as Moslems against the Unbelievers.

SHILLABER, Benjamin Penhallow, humorist, born in Portsmouth, N. H., July 12, 1814; died Nov. 25, 1890. He began his career

as a printer at Dover, N. H., and in 1835 removed to Demerara, Guiana, where he worked as a compositor in a printing office. In 1840 he became connected with the Boston Post, in which he published many sketches under the title "Sayings of Mrs. Partington." He became one of the editors of the Boston Saturday Evening Gazette in 1856, and after ten years removed to Chelsea, Mass., where he devoted himself to literary work. His books include "Rhymes with Reason and Without," "Ike and His Friends," "Life and Sayings of Mrs. Partington," and "Partingtonian Patchwork."

SHILLING, a British silver coin, equivalent to 24.3 cents in the money of Canada and the United States. The shilling consists of 12 pence, or one-twentieth of a pound sterling. The shilling was equal to a certain number of pennies prior to the time of Henry VII., but the number was fixed at twelve as early as the time of the Conqueror. In the colonial times of America the value varied greatly. At present the term shilling is applied locally in the United States to 12½ cents, two being equal to 25 cents, popularly called two bits in some sections.

SHILOH (shi'lò), an ancient town of Palestine, in the region occupied by the tribe of Ephraim. It was the sanctuary of the ark in the priesthood of Eli and Samuel, when it formed a religious center of influence. The Philistines destroyed it after the disastrous Battle of Ebenezer. Its site is thought to be occupied by the

modern village of Seilun.

SHILOH, Battle of, an important engagement of the Civil War, so named from a church about two miles west of Pittsburg Landing, on the Tennessee River. The Union army of 40,000 men was commanded by General Grant and the Confederate of 45,000, by Generals General Grant Johnston and Beauregard. reached Pittsburg Landing with his army, and on April 6 was attacked by the Confederates, the latter driving divisions of the Union army under Generals Sherman and McClernand back with great loss, but in the afternoon General Johnston was killed and the Confederates retreated. General Buell joined Grant with 7,000 men the next morning, when the Union army assumed the offensive, and in the afternoon began to rout the Confederates and force them to make a final retreat. The Federals lost about 13,500 and the Confederates about 14,000. engagement is also called the Battle of Pittsburg Landing.

SHINTOISM (shǐn'tō-ĭzm), one of the chief religions of Japan, formerly the universal religion of that country. In 552 A. D. Buddhism was introduced from Corea, and the two now form the religions of the Japanese. Shintoism is primarily concerned with the worship of nature, but since its first introduction it has partaken largely of a form of hero and ancestor worship. The Mikado is regarded the direct descendant and representative of the sun god-

dess Amaterasu. Worship implies implicit obedience to him.

SHIP

SHIP, the name applied in a restricted sense to a large vessel with bowsprit and three masts, each of which carries square sails, but in an extended sense to vessels adapted for navigation, including all kinds except boats. The restricted application of the term was formerly observed with marked care, but its use has been modified by the increase of size in sailing vessels and the



enlarged use of steam power as a propelling agency. Ships are now applied to many uses and the construction and name vary according to the purpose they are to serve; thus, have arisen such terms as transports, barks, luggers, schooners, sloops, brigs, galleys, xebecs, merchantmen, man-of-war ships, and many others.

The bowsprit is a spar projecting forward and usually slightly upward from the bow of the vessel, resting upon the stem and apron, and supporting the boom. The masts are named in consecutive order from the fore, including the foremast, the mainmast, and the mizzenmast; and the fourth, if present, is called the jiggermast. Each mast is made up of a lower mast, a top mast, and a gallant mast, and the main sails carried on each of the masts are named according to the particular one to which they belong. The brig has two masts with square sails and is smaller than a ship, while the schooner has two or three masts, and the sloop has only one. A cutter is formed quite like a schooner, and a barkentine combines the features of a schooner and a ship proper. The different parts of a ship include the sails, made of stout fabric and designed to propel the vessel; the rigging, ropes, and chains; the spars, including the timber above the hull; and the hull, the part that glides in the water. There are three general divisions of the hull: the bow, or forward part; the waist, or middle part, and the stern, or after part. The raised sides are bulwarks, and the part open to the sky is the upper deck.

SHIPBUILDING. Ancient. It is probable that the construction of vessels to move on water was first suggested by floating logs in rivers and

lakes. Later rafts were made by fixing planks and spars together to form a floating surface, thus constituting a strong, buoyant support for a cargo, and later large tree trunks were hollowed out and sharpened at the ends to form primitive canoes. It is known that two modes of propulsion, those by oars and sails, are practically as old as the early stages of constructing sailing vessels. The Mediterranean Sea is the noted scene of much activity by ancient nations in the construction and use of vessels of different kinds, and in shipbuilding these nations made use of both means of propulsion, as in the galleys and triremes. However, as barbarism overthrew the ancient civilizations, it materially retarded shipbuilding. Consequently it became necessary for the people of medieval times to draw largely upon their own resources in planning and building ships. After the decline of Rome no people possessed stronger galleys and more fearless sailors than did the Norsemen, who cruised along the Atlantic coasts of Europe and Africa and penetrated all parts of the Medi-

The discovery of the compass did much to introduce better methods of navigation. This circumstance and the establishment of sailing routes to India and America were epoch-making events in the construction and use of vessels fitted to brave the high seas in regions far from land. Spain was long the foremost naval power and marine nation, but it met an active competitor in Holland in the 16th century. France, Denmark, and England in the meantime made rapid strides toward building powerful navies. Shipbuilding was one of the foremost branches of the manufacturing industry in the colonial period of America, especially in the New England states. The first American ship was built in 1607 near the mouth of the Kennebec River and was called the Virginia, and in 1698 a law was enacted that all vessels of more than thirty tons should be built under the supervision of a shipwright. American ships began to enter into active competition with those of Europe in the early part of the 18th century, American manufacture being facilitated by the cheapness of large and valuable timber. Consequently sailing vessels long formed a chief product of manufacture for export.

Modern. Shipbuilding was modified remarkably after the introduction of steam as a propelling force. The first vessel to apply steam as the motive power was built by Robert Fulton in 1807 and was named the Clermont, which plied successfully on the Hudson River. In 1811 was completed the first steam vessel of European construction, the Comet. It was the earliest steam vessel to be constructed on a plan fitted for service on the sea. Captain Ericsson, in 1837, completed a small steam vessel driven by a screw, with which he sailed successfully off the coast of England, by which an epoch was marked in shipbuilding. The Great Western

was the first vessel to commence regular Atlantic passage under steam, in 1838, but its propelling power was by paddles. Soon after wood began to give way to iron as a material in construction and then to steel, and the screw began to be generally adopted in 1845, its importance being recognized by efficient service in several ships of war. It has been found that an iron vessel is lighter than one of the same size built of wood. Besides, iron is much more durable, has greater strength, and can be bent into the required shape.

All the largest vessels are now propelled by steam, and, in fact, sail ships are practically discarded from the important freight and passenger service. The reason is to be found in the circumstance that a steam-propelled vessel can make material progress in spite of unfavorable wind, and its capacity for rapid sailing is greatly in excess under all circumstances. The largest steam-propelled vessels are very large, having a capacity up to 32,500 tons, with machinery of from 25,000 to 70,000 horse power, and in many cases four masts are added to further facilitate progress in sailing. mense vessel called the Great Eastern was built in England in 1852, having a length of 692 feet. It was the largest vessel built up to that time, but did not prove practical.

In modern shipbuilding attention is directed particularly to the safety of vessels, which depends upon strength, stability, water-tightness, and floatability in case of injury. The employment of steel and iron in construction has revolutionized naval architecture, and by the use of these materials it is possible to devise framing and plating to insure great strength. Watertightness depends upon calking the seams between plates or planks, for which purpose oakum is driven into the slight spaces until it is hard, and the calking is made secure by laying the planks with a slight bevel outward and covering it with hot pitch or marine glue. In modern construction floatability, when vessels are injured, is dependent upon compartments made water-tight, which are secured by bulkheads constructed to extend at intervals across the ship. In most merchant vessels there is but one compartment, while warships are provided with a number, some running across the vessel and others being longitudinal.

The first armored battleships built in the United States were the Maine and Texas, begun in 1889, and in 1891 work was commenced on the Massachusetts, Oregon and Indiana, which carried four six-inch, four eight-inch, and four thirteen-inch guns and were considered among the most powerful vessels at the time of their completion. Work on the Iowa, an armored vessel of 11,340 tons, was commenced in 1893, and soon after the Kentucky and Kearsarge, each 11,525 tons, were ordered. The Alabama, Wisconsin and Illinois have the same capacity, while the Missouri and Ohio, completed in 1903,

have a capacity of 12,500 tons. In 1901 the Georgia, Virginia, Nebraska, New Jersey, and Rhode Island, each 15,000 tons, were commenced, and in 1902 work was begun on the Louisiana and Connecticut, capacity 16,000 tons. The Tennessee and Wisconsin, commenced in 1902, are 502 feet long and have a displacement of 14,500 tons. These vessels, besides automatic and machine guns, carry 22 three-inch, 16 sixinch, and four ten-inch guns. The California, Idaho and Mississippi, each with a displacement of 32,000 tons, were under construction in 1915.

In the construction of iron and steel vessels the United States holds second rank, being exceeded only by Great Britain. Below is shown a comparison of the tonnage of iron and steel vessels constructed in the two years named:

COUNTRY.	1902.	1914.
Great Britain	1,581,406 270,932	1,692,430 490,854
Germany	252,719 55.345	410,360 115,682
Norway and Sweden	27,572 12,542	68,690 30,640
Austria-Hungary		61,285

Modern naval architecture is a matter of novelty when compared to pioneer shipbuilding. From primitive construction to the present is a long space of time and an equally great difference in strength and capacity. Such vessels as the German steamers Imperator and Europa and the English steamers Olympic and Aquitania are larger than the famous Great Eastern: Modern ocean steamers can safely carry a crew of 800 men and 2,000 passengers, besides 5,000 tons of coal, 8,000 tons of water, and 4,500 head of cattle. The following shows the gross tonnage of a few of the large steamers:

VESSELS.	DEPTH.	BRDTH.	LGTH.	TONS.
Kaiser Wilhelm II	38	72	678	19,400
Celtic	42	75	700	20,175
Kronprinzessin Cecilie	43	76	702	20,200
Baltic	49	75	725	23,000
Mauretania	51	88	760	32,500
Olympic		92	890	45,000
Aquitania		92	901	47,000
Europa		96	911	50,000
Imperator		97	898	52,000

SHIP RAILWAY, the name applied to a railway constructed for the transportation of ships from one body of water to another, the object being to overcome long tours by water. These means of transportation are not numerous in modern times, but were used quite extensively by the natives. The Greeks operated a railway of this kind across the Isthmus of Corinth as early as 425 B. c. and transported vessels 150 feet long in this way. De Lesseps proposed such a railway across the Isthmus of Suez in 1860, but he finally substituted for it the present Suez Canal. Captain Eads projected a ship railway across the Isthmus of Tehauntepec, in Mexico, in 1879. He proposed to transport ships 350 feet long in cradles running on 1,380 wheels at the rate of six to ten miles an hour. Congress failed to give financial support to the

project and it was abandoned after the death of

the promoter.

A ship railway was proposed across the neck of land between Chignecto Bay and the Gulf of Saint Lawrence, a distance of fifteen miles. Work was commenced on this road in 1888, but was abandoned after three years on account of a lack of funds. The purpose was to run cars under the ship, into the water, and carry it on steel cradles at a speed of about ten miles an hour, the cars to be drawn by locomotives. No modern ship railway of material size has been successful, and the project has been displaced either by the construction of canals or the operation of railways.

SHIPTON, Mother, a reputed prophetess, born in Yorkshire, England, in July, 1488. In 1645 a collection of her prophecies was published and in 1660 she was alluded to in a comedy. The most famous of her prophecies is the one made public in 1641, which indicated the fate of Wolsey and Lord Percey, foretelling that the former would not live to reach York. It is considered that this prophecy was fulfilled, since he was arrested at Cawood shortly before his installation as Archbishop of York. A set of rhymes published in 1862 was formerly assigned to her, which foretold that the end of the world would occur in 1881, but they were written by Charles Hindley.

SHIPWORM, or Teredo, the name of a wormlike mollusk, so called from its boring into the timbers of vessels below the water line. It is from one to three feet in length and the body is covered with a shell consisting of two valves. The shell is not large and only covers a part of the body and in some species is reduced to mere appendages of the foot. These mollusks attack wood immersed in sea water, whether of ships or piers, and bore in the direction of the grain. They carefully avoid the tube or opening made by their neighbors and swallow the dust of the rasped wood. Reproduction takes place through an ovoviviparous process, and the young attach themselves to the wood and begin to bore at an early age. These mollusks are highly detrimental to piles, wharves, wooden ships, and fish

SHIRAS (shi'ras), George, American jurist, born in Pittsburg, Pa., Jan. 26, 1832. He completed the course of study at Yale University by graduation in 1853 and, after studying law in the Yale Law School, was admitted to the Pennsylvania bar. He practiced successfully in Pittsburg, being associated with many important cases, and in 1892 was appointed an associate justice of the United States Supreme Court by President Harrison. Yale University granted him the degree of LL. D. in 1883. He was one of the judges who decided against the constitutionality of the income tax in 1894. In 1903 he retired from the bench.

SHIRAZ (shē'rāz), a city in Persia, capital

of the province of Farsistan, 164 miles northeast of Bushire. It occupies an elevated site 4.500 feet above sea level and is surrounded by magnificent orchards, vineyards, cypress groves, and rose gardens. The city dates from 697 A. D., when it was founded on a favorite site as a resort for Persian princes, and through all the succeeding centuries its fame has been proclaimed in Persian poetry. A wall four miles in length surrounds the city, inclosing many beautiful mosques, palaces, and institutions of learning. It has manufactures of wine, rosewater, cutlery, silk, cotton and woolen goods, firearms, glass, and earthenware. The trade is extensive and it is visited by many large caravans. Tamerlane captured Shiraz in 1387. In 1812 and 1853 it suffered greatly by destructive earthquakes, fully 12,000 people losing their lives. Among the eminent poets and scholars who claim it as their birthplace are Hafiz, Sibuyah, and Saadi. The tombs of Hafiz and Saadi are in its neighborhood, and 35 miles northeast are the ruins of the ancient city of Persepolis, which was occupied as the capital of Persia under Xerxes and Darius. Alexander the Great destroyed Persepolis, but remains of their palaces may still be seen. The population of Shiraz is estimated at 48,460.

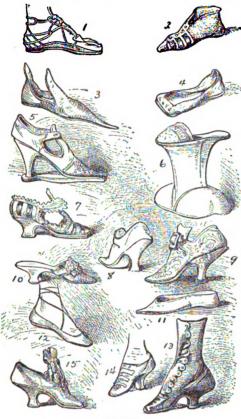
SHIRE (she'ra), a river in the southeastern part of Africa, the outlet of Lake Nyassa. It has a southerly course of 250 miles, entering the Zambezi about 90 miles above its mouth. The upper course is obstructed by many rapids and cataracts, where the fall is 1,200 feet in a distance of 35 miles, but the lower part is navigable for large vessels.

SHISHAK (shī'shak), the name of a number of monarchs of Egypt, classed in the twentysecond or Bubastite dynasty, thought to have been of Semitic descent. Shishak I. is mentioned in the inscriptions placed on the portico of the great temple of Karnak by the Bubastite dynasty and on several statues to the goddess Pasht. When Solomon pursued Jeroboam, the latter fled to Shishak for protection, but after the death of Solomon he became sovereign of the newly formed kingdom of Israel, which was separated from Judah at that time, and Rehoboam was made king of the latter. It is evident from monumental inscriptions that Shishak marched to Jerusalem against Rehoboam in the fifth year of the latter's reign, and after taking the city carried the treasures of the temple to Egypt. Scenes from this conquest of Jerusalem are recorded on the monuments of Karnak.

SHITTIM (shĭt'tĭm), the wood of the shittah tree, which is mentioned several times in Exodus and Deuteronomy. This wood was used principally in building the tabernacle and is identified with the Acacia seyal found in the vicinity of Sinai and the Dead Sea. It is hard, has a fine orange-brown color, and is not attacked by insects. The tree has small leaves and grows to a height of twenty feet.

SHODDY. See Rag Trade.

SHOES, articles of wear for the feet, made mostly of leather, but also of several other materials. The Egyptians, Greeks, and other



SHOES.

1, Italian Sandal; 2, 12th Century; 3, Italian Shoe; 4, 15th Century; 5, Catherine de Medici; 6, Venetian; 7, 17th Century; 8 and 9, 18th Century; 10, Louis XVI; 11, French Shoe, 18th Century; 12, 19th Century; 13, 14 and 15, Modern.

ancient peoples wore a rudimentary shoe, consisting mainly of a sole held on the feet by straps. Any one of this class of footwear is known as a sandal. For centuries the Egyptians wove a kind of shoes with strips of papyrus, which they painted and ornamented with remarkable skill. It was customary to wear the sandal in Rome, but later coverings were provided for the whole foot. Subsequently the Roman footwear was made more durable for army service by protecting the soles with nails and metallic plates. The manufacture of shoes is an important industry in Canada and the United States, and those produced are manufactured almost exclusively of leather. They are largely made by machines, but the best kinds are hand-sewed. In shoemaking it is necessary to use several kinds of machines, some fitted to stitch the sole and others designed to sew the upper parts. Ingeniously constructed machines are employed for pegging

the soles. The American Indians made buckskin shoes called *moccasins*.

Boots are a modified form of shoes, having the upper leathers lengthened to form a protection for a part of the leg, while slippers are a low form used largely for indoor wear. In Holland, France, and other countries of Europe shoes are made to some extent of wood; in Japan, of paper and plaited straw; and in many tropical countries, of plaited grass and hemp. It would be difficult to enumerate all the different kinds of shoes worn, since the art of dressing the feet for comfort, convenience, and fashion is quite as notional as the apparel fitted for other parts of the body. In China the root of the females of certain classes is compressed from early youth, and the shoe worn by the adult of those classes is only five or six inches long. Among the remarkable matters of interest to be observed in the shoe trade is the fact that there has been a wonderful revolution in the art of making and repairing shoes, the factory-made product having almost entirely driven the boots and shoes of the hand manufacturers from the market.

SHOGUN (sho'goon), or Tycoon, a military title of Japan, first employed in the 1st century before the Christian era, when Emperor Suijin divided the empire into four divisions. The power of the four military rulers was gradually enlarged until 1603, when they became the ruling element in the country. However, the office of shogun was abolished after the revolution of 1608. In that year the emperor, or Mikado, was restored as the central power of the nation.

SHONTS, Theodore Perry, public man, born at Meadsville, Pa., May 5, 1856. His parents moved to Iowa in the early sixties

and settled at Centerville, where he attended the public schools. He studied at Monmouth (Illinois) College, graduating in 1876, and the same year went into the banking business at Centerville. S u b s e quently he studied law and became a



THEODORE P. SHONTS.

member of the law firm of Drake, Baker & Shonts, practicing four years, and in 1882 superintended the construction of the railway from Albia to Centerville, now a part of the Iowa Central system. Later he was president of the Toledo and Western Railway and a director of several banks and manufacturing enterprises. In 1905 President Roosevelt appointed him

chairman of the Panama Canal Commission. He resigned the chairmanship in 1907 to become president of the Interborough Rapid Transit Company of New York City.

SHOOTING, the practice of competing in marksmanship with the rifle, pistol, and other small arms. It is an exercise of value in securing proficiency and accuracy in the use of firearms. Contests with the military rifle have been in vogue for many years, and several associations are maintained to promote the ex-

associations are maintained to promote the exercise both for sport and to secure development in accuracy. The first annual competition was held in the State of New York in 1873, and since that time national and international contests have been numerous. The Palma trophy has been the object in competitive tests at various times. It was won by an American team in Ireland in 1880, by a Canadian team in 1901, by a British team, at Ottawa, in 1902, and by an American team, at Bisley, England, in 1903. The American team won the international Palma medal at Ottawa, Canada, in 1907. Shooting is a part of the competitive tests at

the international Olympia games. The Olympia contests held at Bisley, England, were won by American rifle shots in 1908.

SHORTHAND, or Phonography, any system of handwriting that reduces the number of muscular movements required to keep pace with uttered speech. It differs from longhand in that characters are used to represent words, parts of words, or sounds instead of all the elementary sounds of words. The art is of great antiquity, having been employed by the ancient Greeks and Romans, both to secure brevity and secrecy. but all traces of ancient systems were lost in the Middle Ages. At present four distinctively different systems are in use, including phonography, or sound writing; stenography, or compressed writing; tachygraphy, or quick writing; and brachygraphy, or short writing. The underlying principles of these processes have led to the publication of fully 300 different methods or systems, all possessing more or less value in writing the various languages now spoken. Timothy Bright published the first modern system of shorthand in 1588, which made use of marks instead of letters of the alphabet. The system published by Peter Dales in 1590 used characters to denote words. These were superseded in 1602 by a system of shorthand devised by John Willis, who adopted arbitrary signs, thus introducing to some extent the elements employed by the more practical systems now in

Isaac Pitman published his work on short-hand in 1837 and was the first to use the word phonography. His system is based on the sounds of the English language. It rapidly superseded other systems and was adapted to be employed in many foreign languages, among them the German, Dutch, French, Italian, Japanese, Spanish, and many others. He used 41 letters to

represent the elementary sounds, six long and six short vowels, five diphthongs, and 24 consonants. Double and treble consonants for abbreviating the writing were made by hooks and circles at the beginning and end of the consonant strokes. This system rapidly revolutionized shorthand writing, being well adapted to secure legibility as well as the greatest degree of brevity. Since its publication many other systems have been either modified from Pitman's or originated independently, but the Pitman system is still a standard.

Shorthand is now taught in all the business and commercial schools and has found a place in many of the secondary, special, and public and private high schools. It is employed largely in reporting speeches, in newspaper and court reporting, and in general office work. Among the leading systems in America are those of Cross, Gregg, Pernin, and McKee. The first mentioned, originated by J. G. Cross and known as Cross's Eclectic Shorthand, is based largely upon strokes and their position. This work has been published in more than sixty editions. Another system, called Longley's Eclectic Phonography, is in extensive use. The number of words and syllables uttered by a speaker in a specified time varies largely in individuals and in different languages. Usually from 75 to 180 words per minute may be taken to represent the extremes in the English language, while the average number of words is about 100 per minute. In competitive tests the record is from 200 to 280 words per minute, but this pace can be maintained only for ten or fifteen minutes in succession. A skillful reporter is able to take fully 150 words in a minute and usually transcribes that number on the typewriter in three minutes, thus averaging about fifty words per minute in the completed manuscript.

SHOSHONE FALLS (shō-shō'nē), a remarkable cataract in Idaho, on the Snake River. The current is about 950 feet wide and falls in the form of a semicircle, the height being about 210 feet, exceeding the Niagara Falls 40 feet. Precipitous walls of rock fully 1,000 feet high form barriers on both sides of the river, and four miles up the river are the Little Shoshone Falls, thus giving the region a remarkably interesting aspect. See Snake River.

interesting aspect. See Snake River.

SHOSHONES (shô-shô'nēz), or Snakes, an American Indian tribe, formerly resident in the region now occupied by Utah, Idaho, and Nevada. They include a number of bands, among them the Buffalo Eaters and White Knives. Lewis and Clark first came in contact with them while penetrating the regions beyond the Rocky Mountains in 1805 and found them a peaceful class of natives. The advancement of settlers was the occasion of hostilities near the Humboldt River and Great Salt Lake in 1849, and these were succeeded by battles in 1863. A treaty was made with them in 1867, when the government assigned them land in

sections of Nevada, Utah, Idaho, and Wyoming. They include about 5,750 at the present time, numbering among their membership many of considerable advancement in education and the arts. Christian missions have been conducted among them with some degree of success.

SHOT, the general name applied to pellets and bullets used in firearms of various kinds. Round stones were first employed for shot when powder came into use, but it was soon found that a regularly formed ball made of metal is more convenient and far more effective for all purposes. Solid shot is not used as extensively as formerly, but hollow projectiles are employed instead. The size of the shot varies materially with the kind of guns from which it is to be thrown, ranging from very small pellets to projectiles weighing about a ton. The material used is cast iron or steel, but the missiles are prepared differently, depending upon the purposes for which they are to be employed. They include canister, grape, shrapnel, bar, and numerous others.

Canister shot is made up of small iron or lead balls placed in a sheet-iron can, and is designed to burst on leaving the gun. Grapeshot is made of a number of small cast-iron balls, so adjusted that they may be thrown in a body from the gun. Shrapnel shot is made by placing a number of musket balls in a cast-iron shell and filling the intervening spaces with sulphur or resin. This material is added to harden and form the balls into a solid mass, and powder is afterward placed within to burst the shell on striking the object against which the shot is thrown. Bar shot is employed to destroy the rigging of a ship. It consists of discs of iron joined by a bar, but a chain is sometimes used for a like purpose.

Sportsmen use pellets of lead of various sizes, this depending upon the kind of game hunted. The finer grades are more serviceable for small animals, as they are less likely to damage the flesh, while larger classes are needed to kill more bulky game, such as geese and brants. Shot of this kind is made by melting the lead and dropping it through sieves from a high tower into water. The dimension of the shot depends on the size of the hole of the sieve or colander through which the metal passes. As they fall through the air they become cooled and hardened. Shot towers vary in height from 100 to 150 feet. After dropping the shot from the top, it is separated according to the different sizes and polished. A newer process is to mold the metal by running it in a molten state into a trough and allowing it to drop through little holes into molds, which discard the pellets as soon as formed and drop them into a bed of graphite.

SHOTGUN, the name of a weapon used for hunting small game, such as squirrels, rabbits, grouse, and waterfowls. Weapons of this class formerly had a single barrel and were loaded by passing the ammunition into the muzzle, for which purpose a ramrod was attached to the lower part of the barrel. Later it was superseded by the double-barrel shotgun, in which two loads were entered from the muzzle, and both styles were fired either by the flint-lock or by percussion caps. The first breech-loading gun was invented in 1836. This weapon consists of one or two barrels that open at the breech, working on a hinge, and the charge is placed in shells made of brass or partly of brass and partly of paper. These shells contain the powder and shot and in the rim is the percussion cap, which is ignited by means of a hammer or a mechanism in the breech. The newer shotguns have a single barrel with a magazine beneath. They are loaded and fired in the same way as the repeating rifle. The best barrels are made of Damascus twist, or laminated steel, and the sizes usually are 10 or 12 bore. Some shotguns have a metallic stock or shoulderpiece, but most of them are of a fine grade of wood, and some contain a small cavity in which to carry shells. See Gun.

SHOVELER (shuv''l-er), or Spoonbill, the name of several species of duck, so called from the form and size of their bill. The common shoveler, though smaller than the mallard, is highly esteemed for its flesh. The female has dull plumage, but the male is finely decorated, having a white breast and greenish tints on the tail coverts and the head. It is not related to the true spoonbill, which is a wading bird of the heron family.

SHOWERS OF FISHES, a peculiar occurrence sometimes seen in various regions, particularly in tropical latitudes. Among the instances of this kind is a shower that fell near Merthyr-Tydvil in Wales, where shall fishes were found over an area of several square miles shortly after a rainstorm. Another instance occurred in the Isle of Mull, in which herrings were found 500 yards from the sea, and when first seen they were still alive. The phenomenon is due to the circumstance that large columns of water are often taken up by whirlwinds and carried at a considerable elevation some distance from the sea, where the water falls to the ground accompanied by the fishes taken up from the sea. In tropical countries many bodies of water dry up, and fish and other living forms remain alive at some distance below the surface of the dried mud, but revive fully when the basin is again filled with water. This explanation accounts for the rapid population of these water beds with fish, instead of falling from the clouds, as some suppose.

SHREVEPORT (shrev'port), a city in Louisiana, capital of Caddo Parish, on the Red River, 300 miles northwest of Baton Rouge. It is on the Kansas City Southern, the Texas and Pacific, the Saint Louis Southwestern, the Queen and Crescent, the Missouri, Kansas and Texas, and other railroads. The site consists of ele-

vated and gently rolling ground. Among the features are the parish courthouse, the Federal building, the Charity Hospital, the opera house, the First National Bank building, the high school, and the Cooper building. It has a large trade in cotton, lumber, fruit, and produce. Natural gas is found in the vicinity. The manufactures include cotton goods, cigars, ice, lumber products, cotton-seed oil, carriages, hardware, and machinery. The utilities include gas and electric lighting, sanitary sewerage, pavements, waterworks, and electric street railways. It was settled in 1833 and incorporated in 1839. Population, 1900, 16,013; in 1910, 28,015.

SHREW (shru), a genus of animals resembling the mouse and the dormouse, but distinguished from them in having soft fur and an elongated muzzle. A large number of species have been enumerated, of which the common shrew is the best known. It is about the size of a mouse, but has a prolonged muzzle, small



WATER SHREW.

eyes, and a four-sided tail. The ears are short and the color is brownish-black. The food consists of insects, worms, and the smaller mollusks. These animals come out in search of food at night and are noted for their tendency to fight, the stronger often killing and eating their weaker opponents. The shrew mole of North America includes several species and is very nearly allied to the moles. Several species are common to Europe, all more or less similar to the American species, but differing from them in various respects, especially in being larger and having longer legs. The water shrew is larger than the American shrew mole and the snout is quite pointed. It is frequently seen on the banks of streams and lakes, often entering the water. Some species burrow in the fields and gardens in search of worms, which is true of the American shrew mole.

SHRIKE, a genus of birds of the insessorial family, widely distributed in America, Europe, and other continents. The food consists of insects, frogs, mice, and small birds, receiving from their habit of killing other birds the name of butcher bird. The great American shrike is about ten inches long. It has a grayish color with whitish markings, and is able to imitate

the voice of other birds. About thirty other American species have been described, some of which are native to South America. The redbacked shrike of Europe is about eight inches



long, and the great gray shrike of Asia and North America approaches the thrush in size.

SHRIMP, an extensive genus of ten-footed crustaceans. They resemble the lobster and crawfish, but differ from them in having an elongated, tapering, and arched form. The claws are small, the rostrum is short, and the tail is long and fanlike. Their whole structure is delicate, many species resembling in hue the objects near which they develop, thus escaping easy observation. They burrow in the sand by a peculiar motion when alarmed, or seek safety by hiding under rocks and pebbles. The size is from two to three inches in length. Shrimps are a favorite food in many European countries, and on boiling assume a brownish color. They are widely distributed, but are most abundant in tropical waters, and are used chiefly as bait for fishing in the United States. The common



COMMON SHRIMPS.

shrimp is caught by large nets with a semicircular mouth.

SHROVETIDE (shrōv'tīd), the days immediately preceding Ash Wednesday, at which time Roman Catholics were accustomed to confess their sins as a preparation for Lent. Shrove Tuesday was made a season for feasting and merriment, and is still called *Mardi Gras* by the French.

SHUBRICK (shū'brĭk), William Branford, naval officer, born on Bull's Island, S. C., Oct. 31, 1790; died in Washington, D. C., May 27,

1874. He served on the Hornet and Constellation in the War of 1812, aiding in the defense of Norfolk against the British. Later he commanded in the West Indies and in the Mexican War. From 1854 to 1858 he was chairman of the lighthouse board, and in the latter year took command of an expedition against Paraguay to obtain reparation from that country for firing on the steamer Water Witch. He retired with the rank of rear admiral in 1862, but served as chairman of the lighthouse board until 1870.

SHUFELDT (shū'fělt), Robert Wilson, naval officer, born in Red Hook, N. Y., Feb. 2, 1822; died Nov. 7, 1895. In 1839 he became midshipman in the navy, and by 1854 rose to the rank of lieutenant, but resigned in the latter year to become chief officer of a transatlantic steamship line. He was United States consul general at Havana in the first part of the Civil War, but in 1863 reëntered the navy and commanded the steamship Conemaugh in the blockade of Charleston, S. C. From 1864 to 1866 he had command of the steamer Proteus and in 1870 became commander of the monitor Miantonomoh. He sailed to Africa and the East Indies in 1879 to promote American trade interests with those countries. In 1883 he was made rear admiral and the following year retired from the service. The Sultan of Zanzibar, Said Barghash, presented him with a sword.

SHUFFLEBOARD (shuf'f'l-bord), or Shovelboard, a game played by two or four persons with iron weights, on a board sprinkled with fine sand. Two sets of four weights, weighing about eight pounds each, are used in the game. The board is thirty feet long and has raised edges. A line is drawn across the surface about five inches from each end. A set of weights is used by the players, who divide into opposing sides, and the game consists of sliding the weights in rotation along the board. Twenty-one points comprise the game. score is given for the piece nearest the line; two, for the piece between the line and the end; and three, when the weight projects partly over the edge of the board. On the deck of ocean steamers the game is played on a figure chalked on the deck. In that case wooden weights are used, and they are pushed by a long staff with a curved end. Exactly fifty points are required to win the game, and if more scores are made they are deducted instead of added.

SIAM (sf-ăm'), an independent kingdom in Southeastern Asia, including a part of the Malay Peninsula and a part of the Indo-Chinese Peninsula. It is bounded on the north by Burma and French Indo-China, east by French Indo-China, south by Cambodia, the Gulf of Siam, and the Straits Settlements, and west by the Indian Ocean and Burma. The long and narrow strip extending south is known as Lower Siam, which comprises about one-fourth of the country, and the compact region in the north is termed Upper Siam. Within recent years the British

have encroached upon the northwest and southwest, while the French have made acquisitions in the east. The total area is given at 236,000 square miles.

DESCRIPTION. A large part of the country lies in the basin of the Menam, which has many navigable tributaries, forming a drainage system of considerable importance. Much of the surface consists of alluvial deposits of great fertility, especially in the region of the Lower Menam, where the river divides into numerous channels that overflow in August and bring a fertility exceeding that of the Lower Nile. The Menam valley proper is about 450 miles long. It has an area of about 23,000 square miles, of which fully one-half is directly influenced by the inundations. This river has its source among the mountains of China, the upper region being considerably elevated and arid. Ranges of hills extend along the western border, but the general elevation of the country does not exceed 600 feet. Extensive jungles and briny swamps characterize a portion of the coast bordering on the Gulf of Siam.

A small part of the western boundary is formed by the Salwin River and the eastern section is drained by the Nam Mun, which flows east and joins the Me-kong in French Indo-China. Along the Gulf of Siam are a number of important inlets, which enlarge the total coast frontage to 1,100 miles. The surface rises gradually toward the source of the rivers, forming in the north an elevated and more or less hilly tableland. Tonle Sap Lake, in the southeast, extends into Cambodia. Much of the surface is covered with extensive forests, including teak, sappan, aloes, rosewood, palms, mangosteen, and ebony.

The climate of Lower Siam is influenced favorably by the sea breezes and is highly salubrious and equable. Toward the north the summer heat is quite oppressive and from November to May very little rain falls. At Bangkok the precipitation is 50 inches, but in some sections it amounts to 235 inches per year. The temperature ranges from 65° to 90°, but in the northern part it falls to 40°. Monsoons sometimes sweep across the country with considerable force.

INDUSTRIES. Agriculture is the chief occupation and rice is the principal product and the national food. It is grown extensively in the lowlands of the south, where large areas are sufficiently moist to yield abundantly. Considerable interests are vested in growing coffee, tobacco, pepper, hemp, rice, and sesame. Other productions include rattan, mangoes, bamboo, and many species of tropical fruits. The country is rich in mineral resources, especially in coal, iron, copper, gold, and precious stones. Other minerals include antimony, tin, zinc, lead, granite, and limestone. The live-stock industry is confined largely to the rearing of sheep, elephants, camels, buffaloes, and poultry. Siam is

noted for its large and beautiful elephants, including the tawny and white species, both of which attain points of superiority. Wild animals are abundant, including the otter, leopard, tiger, crocodile, rhinoceros, wild hog, and orang-outang. Birds of fine plumage and song are abundant. The fisheries yield many marketable species.

The manufacturing enterprises are managed largely by European capital, principally by British, Germans, and French. Rice mills are numerous and considerable capital is invested in the manufacture of sugar from cane, fine textiles, glassware, pottery, jewelry, and lumber. Great Britain, Germany, and China have the largest share of foreign commerce. The exports include rice, teak wood, fish, hides, pepper, and fruits. Among the principal imports are cotton manufactures, gunny-bags, hardware, machinery, opium, silk goods, and merchandise. The transportation facilities are chiefly by water, including coastwise communication and navigation on the Menam, the Salwin, and the Me Ping, a branch of the Menam. About 950 miles of railroads are in operation, the larger part of which is owned and operated by the government. Electric railways are operated in Bangkok and several other cities.

GOVERNMENT. Siam is an absolute monarchy, but the king is aided by ministers of state, who in part compose a legislative council. The ministers are appointed by the crown and constitute the heads of national departments, including those of foreign affairs, justice, finance, war, interior, marine, police, public works, and public instruction. Fifty-one members constitute the legislative council, whose members, including the ministers, are chosen by the king. For the purpose of localizing the government, the country is divided into eighteen provinces and these are subdivided into districts. A certain degree of independence is maintained by the Malay States, which are governed by rajahs under the direction of commissioners. Certain forms of slavery and feudal land ownership are maintained.

Siam is considered next to Japan in adopting modern methods and progressive educational reforms. The government has extended encouragement to the development of industries by Americans and Europeans. Both the dress and customs of Europeans have been largely adopted and many young men are sent to Europe for their education. European teachers and officers are employed in large numbers by the government. The higher classes are considerably advanced in learning, while elementary education is practically universal. No restrictions have been placed upon the construction of railroads. canals, and electric lines, and the general adoption of European machinery and educational ideas. All Siamese between the ages of 18 and 21 are required to serve in the military or naval forces.

INHABITANTS. The Siamese are classed with the Mongolian family and show a close relationship to the people of Anam and Burma. Their skin is darker than that of the Chinese, but lighter colored than that of the people native to Western Asia. In stature they average about five feet four inches. They are kindhearted, tolerant, and polite, but are inclined to be indolent, vain, and superstitious. Bangkok, on the Menam, is the capital and largest city. Other cities include Paknam, Chantabon, Ayuthia, and Korat. A large part of the inhabitants is composed of Chinese and Malays. Population, 8,125,000.

HISTORY. Little is known of the early history of Siam, the popular traditions dating back only to the 5th century B. c. The credible history begins with 1350, when Ayuthia was made the capital. Commercial intercourse was established between Siam and Portugal in 1511, but soon after the Dutch came into control of its foreign trade. Cambodia was annexed in 1532 and the present dynasty, that of Yaut Fa, ascended the throne in 1782. The Burmese captured the capital about the middle of the 18th century, but were expelled by a general named Phya Tak. The country was opened to general trade in 1856 and since then the educational and industrial progress has widened constantly.

Buddhism was introduced into Siam in the 7th century B. c. and is still the principal religion, but a large per cent. of the people profess Confucianism. Christianity is gaining some foothold under a number of missions, which consists mainly of American Protestants and French Roman Catholics. The language spoken may be classed between the Malay and the Chinese, and the written characters appear to have been derived from the Sanskrit. Within recent years material progress has been made in printing in the Siamese language, which is leading to the development of an independent Extensive translations from other literature. languages, especially European and Japanese, have been made.

Chulalongkorn I., the present king, succeeded to the throne on the death of his father, in 1868. He is fifth in descent from Yaut Fa, who gave rise to the present dynasty. While he has been progressive in promoting the development of material enterprises, his government has been somewhat complicated by advances upon his territory by the French and British. In 1893 the French established a protectorate over Cambodia and later extended their sphere of influence over a large part of Upper Siam. Several provinces were ceded to France in 1907. In the same year the British established a sphere of influence on the border of Burma and another between the Gulf of Siam and the Indian Ocean.

SIAM, Gulf of, an inlet of the China Sea, lying within the confines of Siam, Cambodia, and the Malay Peninsula. The width at the

entrance is 240 miles, and it extends inland 400 miles. The Menam and several other navigable rivers flow into it, thus forming an im-

portant water surface for navigation.

SIAMESE TWINS (sī-à-mēz'), the name of two male individuals whose bodies were inseparably connected from birth by a fleshy ligament stretching from one breastbone to the other, which had on its lower border a common navel. They were born in Siam in 1811. The father was a Chinese and the mother a Chino-Siamese. They were named Eng (right) and Chang (left). The connection was such that they faced each other at first, but the fleshy ligament became lengthened by constant strain until they finally stood side by side. When the center was touched, both felt it, but on touching toward one side the person farthest from the point of contact did not feel it. These twins were brought to the United States in 1829 and visited the principal cities of America and Europe, but later settled in North Carolina and married two sisters. The Civil War caused them to lose a large part of their fortune, which they had accumulated by exhibiting themselves, and they made a second general tour that proved highly profitable. Chang was affected by a paralytic stroke in 1870, which did not materially affect Eng, but the former became affected with a disease of the respiratory organs and died Jan. 17, 1874, Eng dying about three hours afterward. These twins attracted wide attention. Medical men of repute expressed the view that the ligament connecting them could have been severed without fatal results, particularly if it had been done at a comparatively early age.

SÍBÉRIA (sí-bē'rǐ-à), an extensive region of Russia, occupying the northern part of Asia. It is bounded on the north by the Arctic Ocean, east by Bering Sea and the Pacific Ocean, south by China and Russian Central Asia, and west by the Ural Mountains, which separate it from Russia in Europe. A large part of the southern boundary is formed by natural characteristics, such as the Amur River, which separates it from Manchuria; the Yablonoi Mountains, in the east central part; the Altai, in the center; and the Thian-Shan, in the west. The area is 4,832,350 square miles, which exceeds in

size all of Europe.

Description. Three principal divisions have been made for the purpose of government, each under a governor general. They are Western Siberia, with an area of 860,020 square miles; Eastern Siberia, area 3,069,750 square miles; and the Amur region, area 903,580 square miles. The surface of this vast expanse is diversified by valleys and mountains, but the drainage is almost entirely toward the north into the Arctic Ocean and the Sea of Okhotsk. In the west are ranges of the Ural Mountains; in the south, the Altai and Yablonoi mountains; in the central east, the Verkhogansk Mountains; and in

the east, the Stanovoi Mountains. Many of the rivers are vast water courses of importance in commerce, but the cold and long winters interfere notably with their general use in transportation. The larger of these rivers are the Obi, Irtish, Tobol, Yenisei, Khatanga, Lena,

Indigirka, and Amur.

Lake Baikal, in the south central part, is the largest of many inland lakes. Other sheets of water include lakes Yege, Chang, and Balkash. In the Arctic and the adjacent seas are a number of islands belonging to Siberia, the most important being Saghalien Island, in the Sea of Okhotsk, and the New Siberia Islands, in the Arctic Ocean. The vast coast line is diversified as to contour and outline, ranging from sand dunes to precipitous cliffs, but the Arctic Ocean is ice-bound about ten months of the year. On the other hand, the Sea of Okhotsk is generally wrapped in dense fogs and endangered by icebergs, thus making navigation impossible during most of the year. The summers are warm and pleasant, but the winters are extremely cold. However, the climate is generally healthful. It is quite agreeable to Europeans in the southern portions. Much of the surface possesses fertility of soil. Siberia has much deposits of minerals, and in the southern portion of the country are valuable forests. Between the Obi and Irtish rivers and in several other sections are vast marshes, and in the north are the tundras, which are made up of frozen swamps that thaw only on the surface in the summer. The forests gradually decrease toward the north, where they assume the form of small shrubs and vegetable forms, and finally merge into small plants and mosses.

RESOURCES AND INDUSTRIES. Siberia has a diversity of products. They are being developed rapidly under the vigorous policy of the present reigning monarch of Russia, who is fostering the building of railroads and canals and the development of its mineral and other natural resources. Fur-bearing animals are numerous. The country has valuable fisheries and vast swarms of wild fowl. The wild animals include sables, reindeer, ermines, elks, foxes, deer, bears, lynxes, wolves, antelopes, and marmots. Among the minerals are iron, copper, gold, silver, mercury, tin, lead, coal, graphite, sulphur, salts, mica, petroleum, and precious stones. Siberia has vast and valuable forests of northern species, including the oak, pine, fir, cedar, and many others. Agriculture and stock raising are the principal industries.

Siberia is regarded by many economists as the future source of wheat and beef for Europe. The leading soil products include wheat, corn, oats, barley, hemp, vegetables, and small fruits. Horses, cattle, swine, sheep, mules, and poultry are reared in abundance. Manufacturing has developed remarkably since the building of the Trans-Siberian Railway. The chief manufactures are furniture, flour, hardware, lumber,

paper, cured fish, leather, machinery, and products connected with the mineral deposits. It has a vast trade with European Russia, the latter receiving large quantities of fish, furs, grain, tallow, hides, and lumber. Russia transports to Siberia such products as machinery, clothing, chemicals, and other manufactured wares. Considerable trade is carried on with China, Corea, Manchuria and Japan.

GOVERNMENT. The vast region of Siberia is politically organized on a somewhat diversified plan. In general the divisions are governed like the provinces of Russia in Europe, but some are grouped under imperial viceroys. Eastern Siberia has its seat of government at Irkutsk and is under an imperial viceroy. The Amur territory, located northeast of Manchuria, is governed from Vladivostok, on the Sea of Japan. Western Siberia is divided into the two provinces of Tobolsk and Omsk, of which the two cities of Tobolsk and Tomsk, respectively, are the capitals. The national government maintains a system of education for instruction in the elementary and industrial branches. Several colleges and universities receive national support, the most important university being at Tomsk, located on a branch of the Trans-Siberian Railway.

About 60 per cent. of the INHABITANTS. inhabitants are Russians. This element includes a large number who descended from exiles who were transported to Siberia for political offenses. A small element of other Europeans is in the country, including chiefly Poles, Finns, and Ger-The natives consist largely of Turks and Mongols, the former predominating in the southwestern and the latter in the southeastern sections. Many Tartars inhabit the region in the vicinity of Lake Baikal, and native Yeniseians are scattered more or less generally in the basin of the Yenisei River. Tunguses inhabit a large section of Eastern Siberia. An element known as Pale-Asiatics is scattered more or less throughout the region of Lake Baikal, and these peoples include the Koriaks and the Kilyaks.

The Russians generally adhere to the Greek orthodox church, but a number of Protestant communities thrive. The Asiatics adhere chiefly to the Moslem and Buddhist faiths. The principal cities include Tobolsk, Omsk, Tomsk, Irkutsk, and Vladivostok. A majority of the inhabitants reside in Western Siberia, but the construction of railways has influenced settlements farther east. In 1897 the population was 5,627,090. No reliable statistics have been published by the government, but a heavy immigration from Russia in Europe has been going on the last decade. In 1917 the population was estimated at 10,842,000.

Algorian The primitive inhabitants of Siberia are known as Yeniseians, so named from their occupation of the Yenisei basin. They were succeeded by tribes invading the region from the south. The advancement of early Siberians in

civilized arts is attested by numerous earthworks and mounds. In the 11th century the Turks conquered the region, but they were driven from the country by the Mongols in the 13th century. Russian Cossacks made invasions from the west in 1580 and established trading posts, but soon turned their possessions over to Ivan the Terrible. The country became a productive furring region for Russian hunters, who penetrated east to Kamchatka by the 18th century. It was long the hope of Russian czars to direct emigration into Siberia, for which purpose it was made a penal colony, and for centuries thousands of exiles and convicts were sent there, a practice continued until 1899. The Amur territory and the coast region of Manchuria were finally ceded to Russia by China in 1860. Other extensions have been made in recent years toward the south of West Russia, including portions of Turkestan and Afghanistan. The abandonment of Siberia as a penal colony resulted from the intention of the Czar to develop it into a region of vast enterprise tributary to the western part of the empire, and since then fully 200,000 emigrants have made settlements annually. The Trans-Siberian Railroad, extending from Saint Petersburg to Vladivostok, a distance of 4,950 miles, is considered the most gigantic railroad enterprise in the world. Other important railroad lines include the Trans-Caspian and branch lines from each of the two great railways. Siberia took an active part in the Great European War until 1917, when Nicholas II. was deposed and imprisoned at Tobolsk, after which the country was disturbed by local wars and incursions of Chinese and other Asiatics.

SIBYLS (sib'ilz), in Greek and Roman mythology, the name applied to several maidens gifted with power of phophecy, who were reputed as living to an incredible age. Writers generally place their number at ten, but one known as Cumaean is the most famed from her mention in the sixth book of Aeneid. She is the reputed writer of nine books in the Greek, generally known as the "Sibylline Books," which she offered to sell to Tarquin the Proud. Not knowing who she was, Tarquin refused to buy them, upon which she burned three and returned with six, demanding the same price as before. Tarquin again refused to purchase and she burned three more, returning with the remaining three, for which she asked the same price as at first. Amazed at her inconsistency, Tarquin consulted the Augurs, who advised him to buy the remaining three at whatever price they were to be had. He found the volumes to contain valuable predictions, but the Sibyl vanished after the disposal of the books.

The Sibylline books were subsequently consulted on occasions of national danger. They were carefully preserved in the temple of Jupiter Capitolinus, but were destroyed when that

structure was burned in 83 B. c. Later the

senate sent delegates to different cities of Italy and Greece to collect and, if possible, restore the Sibylline verses, but it was possible to secure only about 1,000, which received a place in the new temple of Jupiter Capitolinus. Stilicho burned this collection in 408 A. D. Another collection of so-called Sibylline oracles was written by Jews and Christians in Alexandria, Egypt, in the period between the advent of Christ and the 6th century A. D. This collection is entirely distinct from the Sibylline verses of the Greeks and Romans. It was published in fourteen books and had 4,000 lines. A revised edition

was published by Gallaeus in 1689.

SICARD, Montgomery, naval officer, born in New York City in 1836; died Sept. 14, 1900. He graduated from the United States Naval Academy in 1855 and served through the Civil War, taking part in the bombardment of Fort Jackson and Vicksburg. In 1864 he was with the Union forces that attacked Fort Fisher and the following year aided in the bombardment of Fort Anderson. At the close of the war he was stationed at the Naval Academy, remaining there until 1869, when he was given a command in the Pacific fleet. From 1870 to 1878 he did ordnance duty at Washington and in New York City and in the latter year commanded in the North Atlantic squadron. He was chief of the ordnance bureau at Washington from 1881 to 1890.

SICILIAN VESPERS (sī-sĭl'ī-an), the name of a famous insurrection against the French in Sicily, which began on March 30, 1282, at the signal of the vesper bell on Easter Monday. Sicily and Naples had been conquered by Charles of Anjou, brother of Louis IX. of France, but his severe and oppressive rule greatly displeased the people. They applied in vain for relief to the Pope, but at length King Pedro of Aragon undertook the conquest of Sicily and took advantage of the proposal to surprise the French occupants at the ringing of the vesper bells. The inhabitants of Palermo rose against the French at the appointed signal, while other towns soon followed, resulting in the overthrow of the French and the transfer of the island to the Spanish. Men, women, and children were massacred without reserve, fully 8,000 losing their lives. In 1882 the 600th anniversary of the Sicilian Vespers was celebrated at Palermo, the aged Garibaldi being present at the time.

SICILIES, The Two. See Sicily.

SICILY (sīs'ī-ly), an island in the Mediterranean, the largest and most populous tract of land in that sea. It belongs to Italy, from which it is separated by the Strait of Messina, a channel about two miles wide. The island is triangular in form and has an area of 9,700 square miles. On the northern coast are the important gulfs of Palermo and Castellamare and on the eastern is the Gulf of Catania. The coasts of these inlets are quite steep, but the

southern coast is generally flat and quite regular. The surface is diversified with mountain ranges apparently extending from the southern part of Italy, reaching heights from 4,000 to 6,000 feet, but Mount Etna, in the eastern part, has an elevation of 10,865 feet above sea level. Orange groves, vineyards, and mulberry gardens cover the mountain slopes, while forests abound in the higher altitudes. The valleys and plains bear wheat, maize, flax, cotton, hemp, corn, to-

bacco, oats, barley, and vegetables.

The climate of Sicily is healthful, especially in the region of Mount Etna, which is densely populated, although it is exposed to earthquakes and volcanic eruptions. Fogs prevail along the coasts in the autumn and the summer heat is quite intense. Rainfall is abundant for the production of cereals and fruits, and snow and ice are of rare occurrence, except on Mount Etna. Among the fruits are oranges, lemons, dates, almonds, figs, olives, grapes, and pomegranates. It has a corresponding production of dried fruits and wines. The principal manufactures are wine, macaroni, soap, earthenware, dairy products, cotton and silk goods, clothing, sugar, hardware, and machinery. Sardine and tunny fisheries take a high rank. The domestic animals include cattle, horses, swine, sheep, and poultry.

Sicily has a large export and import trade, mostly with Italy, but also with other European countries and Northern Africa. Railroad building has made rapid progress. At present the island has about 500 miles of railways in operation. The principal seaports are Palermo, Messina, Syracuse, Girgenti, Marsala, and Termini. The rural population is still in a rude condition educationally, only a small per cent. being able to read and write, and brigandage and the vendetta still prevail. Caltanissetta, population 25,500, is the capital, but Palermo is much the largest and most important city of the

island.

HISTORY. Two classes of people, known as the Iberian Sicani from Spain and the Siculi from Italy, were the earliest inhabitants of Sicily, but they were pressed toward the interior by colonies of Phoenicians and Greeks. The cities of Messina, Syracuse, and Agrigentum were founded by the Greeks in the 8th century B. C. These Greek settlements became so powerful that the Phoenicians were driven to the western part, and Grecian art, literature, and industry attained a preponderance of influence in the island. In the early part of the 5th century B. c. the Carthaginians became a powerful influence in conjunction with their kinsmen, the Phoenicians, and a prolonged struggle finally ended in favor of the Greeks in 480 B. C., in which the Carthaginian commander, General Hamilcar, was slain. Hannibal next led an army of Phoenicians and Carthaginians against the Greeks, and the First Punic War gave a part of Sicily to the Romans. In 212 B. c. the entire

SICKLE

2628

island became a Roman province. After the decline of Rome, Sicily was invaded by the barbarian tribes from the north, the Vandals conquering it in 440 A. D. The Goths under Theodoric had possession of Sicily until 535, when it became a part of the Byzantine Empire. The Saracens conquered it in 827, holding possession for more than a century, but they were finally driven from the island by the Normans under Roger de Hauteville. His son assumed the title of King of Sicily and Italy as Roger II. in 1130, calling his dominion the kingdom of the Two Sicilies.

The Two Sicilies included the island of Sicily, the kingdom of Naples, and a number of islands in the Mediterranean. The line of kings became extinct in 1189 and Henry VI. of Germany, of the house of Hohenstaufen, secured the kingdom by virtue of his marriage to Constantina, daughter of Roger II., and the crown remained in the German emperors until 1264. Pope Urban IV. bestowed the sovereignty on Charles of Anjou, brother of Louis XIV. of France, in the latter year. A long contest for the throne followed. It ended favorably to the French and brought about the execution of the legitimate heir, Conradin of Swabia, in 1268. Sicily became freed from the French by the aid of King Pedro of Aragon in 1282, the contest being known as the Sicilian Vespers, and a separation from Naples took place, the latter coming under the Angevin dynasty and Sicily under the kings of Aragon.

Sicily remained in possession of the Aragonese sovereigns until 1505, when it was placed under Spanish dominion in the persons of Ferdinand and Isabella. Ferdinand also secured possession of Naples, and both countries remained under Spanish dominion until the War of the Spanish Succession in 1700-13, when Sicily was given by the Peace of Utrecht, in 1713, to the Duke of Savoy, and Naples became a part of Austria. In 1720 Sicily also was annexed to Austria. The Two Sicilies remained under Austrian dominion until 1734, when both Sicilies were annexed to Spain. They were a Spanish possession practically all the time until 1860, the only exception being the brief French rule in Naples from 1806 to 1815 under Joseph Bonaparte. Garibaldi gave rise to a revolution in 1860, taking Palermo on May 11 of that year and following his successes on the island with an invasion of southern Italy. He met little opposition, the people rallying to his standard, while Francis II. fled from Naples. At that time the Two Sicilies ceased to exist as a government by that name, and both joined in the new kingdom of Italy under Emmanuel. Population, 1917, 3,740,860.

SICKLE (sik'k'l), an implement for cutting grain or grass. It consists of a steel blade which is curved in the form of a hook, and on one end is a handle fitted on a tang. In some sickles the blade is notched on one side so it has a serrated edge for cutting. The sickle is held in one hand, while the other hand is used to grasp a quantity

of standing grain, which is held firmly as the sickle is applied to cut the stems. Reaping machines utilize the sickle, but it is made by attaching steel sections to a metallic bar, which is driven rapidly by the driver through the effect of geared wheels.

SICKLES (sik'k'lz), Daniel Edgar, soldier, born in New York City, Oct. 20, 1825; died May 3, 1914. He studied in the City of New York, was admitted to the bar in 1844, and three years later entered the State Legislature. In 1853 he was made attorney of New York, and the same year was appointed secretary of the American legation in England. He was elected to the State senate in 1855, served in Congress from 1857 to 1861, and entered the Union army at the beginning of the Civil War as colonel of a regiment organized in New York. He commanded in the battles of Chickahominy. Antietam, Fredericksburg, Chancellorsville, and Gettysburg, losing a leg in the last named. From 1865 to 1867 he commanded in the second military district, with headquarters at Columbia, S. C., and in 1869 became United States minister to Spain. He resigned that position in 1873 to become president of the State board of civil service commissioners in New York. In 1887 he was made commissioner of immigration, became sheriff of New York County in 1890, and was elected a member of Congress in 1892. Sickles was placed on the retired army list in 1869 with the rank of major general.

SIDDONS (sĭd'dŭnz), Sarah, eminent actress, born in Brecknock, Wales, July 5, 1755; died in London, England, June 8, 1831. She was the eldest of twelve children of Roger Kemble, who was the manager of a company of strolling players, thus giving her familiarity with the stage from an early age. In 1772 she married Mr. Siddons, a member of her father's company, and in 1775 appeared as Portia in the "Merchant of Venice," at the London Drury Lane Theater, but was not reëngaged at the close of the season. She appeared at Drury Lane a second time in 1782 as Isabella in the "Fatal Marriage," when she met with the most enthusiastic reception. For ten years she held the first place among the actresses of England, retiring from the stage in 1812, but subsequently gave public readings from Milton, Shakespeare, and other authors. Her greatest successes were as Lady Macbeth and as Queen Catharine in "Henry VIII." A statue to her honor was unveiled in London on June 15, 1897.

SIDEREAL TIME (sf-de're-al), a measured portion of duration, based upon the apparent motion of the stars. A sidereal year consists of 366.2563612 sidereal days. The sidereal day contains 23 hours, 56 minutes, and 4.098 seconds. See Day.

SIDNEY (sĭd'nĭ), a city of Ohio, county seat of Shelby County, 40 miles north of Dayton. It is on the Miami River, the Miami and Erie Canal, and the Cleveland, Cincinnati, Chicago

and Saint Louis and the Cincinnati, Hamilton and Dayton railroads. The surrounding country is fertile. Among the chief buildings are the county courthouse, the high school, and several churches. It has a public library, electric lighting, and a municipal system of waterworks. Saddlery, machinery, flour, carriages, and clothing are among the leading manufactures. The vicinity was settled about 1800 and the place was incorporated in 1819. Population, 1910, 6,607.

SIDNEY, Algernon, statesman, born in Kent, England, in 1622; executed Dec. 7, 1683. He was a grand-nephew of Sir Philip Sidney and, after receiving a careful education, accompanied his father, the Earl of Leicester, on embassies to Denmark and France. In 1641 he commanded a force of cavalry against the insurgents in Ireland, and, being friendly to the Parliament, secured command of troops under the Earl of Manchester, receiving a severe wound at the Battle of Marston Moor. He was elected to Parliament in 1645, became Governor of Dublin in 1646, and for distinguished services received the thanks of the House of Commons in 1647 and became Governor of Dover. Though approving the execution of Charles I., he did not sign the warrant, and after the restoration of Charles II. cast his influence with the party against the crown. In 1660 he was sent on a mission to Sweden. Soon after he settled at Hamburg, Germany, because of opposition to him by the English court party, but in 1677 obtained permission to return to England. There he became implicated in political intrigues, supported the country party, and was a warm friend of William Penn, whom he assisted in preparing the constitution of Pennsylvania. He was charged with being implicated in the Rye-House plot, a scheme for murdering the king, and, after a trial that brought forth no material evidence against him, was declared guilty and executed along with several others. It was said of him that he met death "with the fortitude of a Stoic." Among his writings are "Discourses Concerning Government," "Letters to Henry Savile," "Apology," and "Essay on Virtuous Love."

SIDNEY, Sir Philip, courtier and author, born at Penshurst, England, Nov. 29, 1554; died Oct. 7, 1586. He was the son of Sir Henry Sidney and entered Oxford University in 1569, where he attained a high reputation for devoted study and scholarship. After making an extended tour through Germany, Italy, and Belgium, he returned to England. He became a special favorite of Queen Elizabeth, largely through the influence of his uncle, Robert Dudley. The Queen sent him on an embassy to the court of Vienna in 1576, but he lost her favor for a time by opposing her proposed marriage with the Duke of Anjou and defending his father in his differences with the queen. His first writings were made public in 1580, when he published a romance entitled "Countess of Pembroke's Arcadia," a work full of the spirit of chivalry.

In 1585 the queen appointed him Governor of Flushing. He immediately proceeded to the Netherlands to take charge of the office, and at once became implicated in the war waged by Spain against Holland. While commanding the Netherlands cavalry at Zutphen, on Sept. 22, 1586, he received a mortal wound and died shortly after at Arnheim. Sidney possessed the elements of a great statesman and soldier and, after living nobly, he died a hero. It is undoubtedly true that the charm of his life has led to an overestimate of the worth of his writings, though they possess no mean value. His fame in literature rests upon his "Defense of Poesy," a work in which he set forth the worth of the poet against the doctrine of the radical Puritans of that day, who were inclined to denounce whatever contributed to the taste for the beautiful. Another work of considerable merit is his "Astrophel and Stella," a collection of sonnets. It was among the first works of this kind to be published in the English. In 1725 his "Complete

Works" was published in London.

SIDON (sī'dŏn), or Zidon, anciently an important city of Phoenicia, on the eastern coast of the Mediterranean, about midway between Tyre and Beyrout. It occupied an imposing site between Mount Lebanon and the sea, and its importance was such that the entire region surrounding it was commonly spoken of under its name. It is thought that the city was founded in 1600 B. c. and that its greatest prosperity was from 1600 to 1200 B. C. For 350 years it ranked as the principal city of Phoenicia, extending its colonies and commerce to all the lands of ancient times. The city was able to withstand the assaults of the Israelites under Joshua, and never came wholly under the dominion of the Jewish nation. At length it was conquered by Tyre, but under the Assyrians, Persians, and Chaldeans retained local independence. At the time Alexander the Great invaded Syria, in 333 B. C., it enjoyed much prosperity and willingly surrendered to that conqueror. Subsequently it lost prestige under the Syrians and Romans, and in the Middle Ages was taken by the Crusaders. The site of this renowned city is occupied by Saida, a seaport of considerable enterprise. It has manufactures of cotton and silk textiles, glass, dyes, and pottery, and a considerable export and import Population, 11,685. trade.

SIEGE (sēj), the location of an army before or around a fortified place for the purpose of compelling the garrison to surrender. The forces that invade a country resort to a siege not only to capture a stronghold of the enemy, but with the additional purpose of preventing the receipt of supplies and reënforcements. Sieges are either by the army or navy and sometimes by both military and naval forces, though where ships are employed the investment partakes of the nature of a blockade. An assault is usually made instead of resorting to a siege, unless it is apparent the former would be impossible or

result in an unusual loss of life. The besieging party usually approaches a fortified place by passages and advanced works, which cover the besiegers from the fire of the enemy. In many cases bombs are thrown at intervals against or upon the fortified position. Those within the fortification, in anticipation of a siege, frequently locate mines at convenient intervals, to be exploded by electric wires on the approach of the enemy. On the other hand, the besiegers fre-

quently tunnel under the walls and attempt to destroy them by firing mines.

The siege of La Rochelle under Cardinal Richelieu, in 1628, which covered a period of fourteen months, is a notable investment of the Middle Ages. The French and Spanish besieged the rock of Gibraltar for four years, beginning in 1779. The German army besieged Metz during the Franco-German War, in 1870, and after a blockade of seventy days received the surrender of 173,000 men. The siege of Plevna, in 1877, was a prominent feature of the Russo-Turkish War. Port Arthur was besieged and captured by the Japanese in 1914. The Russians captured Przemysl and the Germans captured Warsaw and other forts by sieges in 1915.

SIEMENS (se'menz), Ernst Werner, Baron, physicist and inventor, born in Lenthe, near Hanover, Germany, Dec. 13, 1816; died in Berlin, Dec. 6, 1892. He studied at the Lübeck Gymnasium. Subsequently he took a course in the School of Artillery and studied engineering at Berlin, and in 1837 attained to the rank of lieutenant in the army. Though actively engaged for some time in military duties, he devoted himself with much zeal to the study of practical chemistry and physical sciences, and soon invented a process of electroplating, the electric automatic recording telegraph, and the differential governor. In 1847 he discovered the use of gutta-percha in insulating subterranean conductors of marine cables, and adapted its use to submarine mines for the protection of the harbor at Kiel. In 1848 he supervised the construction of the first telegraph line in Germany, between Berlin and Frankfort-on-the-Main, and soon after laid a subterranean line between Cologne and Berlin

Siemens left the government service in 1850 to devote himself entirely to scientific studies. Soon after he established manufacturing houses for electrical apparatus in Berlin, with branch offices in Saint Petersburg, Vienna, London, Tiflis, and Chicago. The central establishment at Berlin is noted as the most famous in the world for the application of electricity to industrial art. In 1879 he built and successfully operated an electric street railway in Berlin, which was the first line constructed in the world. Among his many inventions not named above are the dynamoelectric machine, the process of polarizing relays, the electric railway, the Siemens alcohol meter, the pneumatic dispatch-tube system, the methods for testing underground and submarine cables,

the Siemens armature, and numerous others. The honors bestowed upon him include the patent of nobility by Frederick III. of Germany and degrees by several universities, including the University of Heidelberg. He contributed to many scientific magazines, among them the Polytechnic Journal and Annals of Physics and Chemistry. His writings have been published under the title of "Siemens' Collected Writings and Lectures."

SIEMENS, Karl William, eminent inventor and philosopher, brother of Ernst W. Siemens, born in Lenthe, Germany, April 4, 1823; died in

London, England, Nov. 19, 1883. He studied at the Lübeck Gymnasium and in Magdeburg and Göttingen. Subsequently he took a course in engineering and electricity in the workshops of Count Stolberg. After becoming interested in various inventions with his brother, he went



KARL W. SIEMENS.

to England in 1843 to introduce numerous electrical appliances to public use and manage the branch establishment in London. In 1859 he became a British subject and made England his permanent home. His labors were mostly in two distinct fields, the application of electricity and the application of heat. He designed the steamship Faraday for cable laying, built electric railroads and made numerous useful inventions Among his most noted inventions are the regenerative furnace, the bathometer for measuring ocean depths, the hydraulic brake for preventing the recoil of artillery on warships, and several for the more successful use of the electric light. The Royal Albert medal was conferred upon him in 1874, the Bessemer medal was granted to him in 1875, and he was knighted in 1883. He published "The Conversion of Heat into Mechanical Effects," "Increase of Electrical Resistance in Conductors with the Rise of Temperature," and "Regenerative Steam Engine."

SIEMERING (ze'me-ring), Rudolf, sculptor, born at Königsberg, Germany, in 1835; died in 1905. He studied in his native city and at Berlin. At the latter city he produced the marble statue of King William. In 1877 he completed the monument of Frederick the Great at Marienburg, and subsequently finished the statue of Luther at Eisleben and the war monument at Leipsic. His memorial of Washington at Fairmount Park, Philadelphia, was unveiled in 1897. Other productions embrace the marble statue of Frederick William I., the equestrian statue of William I., and the group in bronze of Saint Gertrude.

SIENA (se-a'na), or Sienna, a city of Italy, in Tuscany, 58 miles south of Florence. It occupies a site on three hills, has narrow and tortuous streets, and is surrounded by a wall. A railroad line connects it with Florence, Pisa, and other cities. It is surrounded by a fertile country, which produces fruits, cereals, and dairy products. Among the larger structures is a Gothic cathedral dating from the 13th century, which contains fine frescoes of scenes in the life of Pope Pius II. and sculptures by Donatello and other noted artists. Other noteworthy buildings include the university, the Church of San Giovanni, the Oratorio di San Bernardino, the institute of fine arts, the public opera, the municipal library, several Gothic palaces, and a number of convents and secondary schools. Among the manufactures are lime, hats, clothing, olive oil, cotton and woolen fabrics, earthenware, and musical instruments. Though founded by Julius Caesar, it contains no remains of antiquity and appears to have obtained its greatest importance in the Middle Ages, when it had about 200,000 inhabitants. Siena produced a school of artists, which included Guido da Siena, Simone Martini, and Baldassare Perruzzi, Population, 1916, 38,665.

SIENKIEWICZ (shěn-kyå'vích), Henryk, novelist, born at Wola Orkzejska, Lithuania, in 1846; died Nov. 16, 1916. He attended the gymnasium and later studied philosophy at the university of Warsaw. In 1872 he made his beginning in the field of literature by publishing "Nobody is a Prophet in His Own Country," a humorous story that gained considerable circulation. He visited the United States in company with Madame Modjeska in 1876 and for some time resided in California, where he planned a colony for Polish immigrants. While there he corresponded to the Polish Gazette, a periodical at Warsaw, signing the letters Litwos. His eminence as an author is based upon "Quo Vadis," which was completed in 1895. This is a historical novel based upon the time of Nero and has been dramatized and translated into the leading languages. Many of his writings deal with Polish history and the cause of Poland, and like Dumas he possessed eminent ability to give a romantic strain and evoke historical personages. He was exiled from Russia in 1905 because of his support of the revolution. Among his chief works are "From the Note-Book of a Posen Teacher," "Deluge," "Without Dogma," "Children of the Soil," "Knights of the Cross," "Pan Michael,"
"Tartar Bondage," and "The Word."

SIERRA LEONE (sĩ-ĕr'rà lễ-ō'nḗ), a colony of Great Britain, on the west coast of Africa. It is situated northwest of Liberia. The colony is separated from the French possessions on the north by the Great Scarcies River and has a coast line of 180 miles on the Atlantic. The total area of Sierra Leone proper, including its newly added dependencies, is about 30,000 square miles. The coast regions are largely lowlands,

which portion has a hot and malarial climate, and there is a gradual rise toward the northwest to the vicinity of the Kong Mountains. Among the products are India rubber, coffee, palm oil, copal, cotton, hides, maize, and fruits, all of these being exported. It has recently developed considerable exports of lumber and various minerals. The region was first discovered by the Portuguese under Piedro de Cintra in 1462, who gave it its present name, but efforts to colonize were not made until in 1786, when the English planted a settlement and built a fort. It was made the seat of government of the British settlements on the west coast of Africa in 1866, these including Sierra Leone, Lagos, Gambia, and the Gold Coast.

The government is administered by a resident governor, assisted by executive and legislative councils. Freetown, the capital and principal city, has a population of 30,000. It was long the most important trade center of West Africa and is now the headquarters for the British military forces in West Africa, but its trade has been diminished considerably by the activity of the French in building up their possessions, particularly Senegal. Several lines of railway have been built inland. The government is giving encouragement to schools and a number of secondary institutions. The colony proper has a population of 78,809, including about 45,000 Christians. Sierra Leone Protectorate, organized in 1896, has a population of 998,500.

SIERRA MADRE (ma'dra), the name generally applied to the great chain of Cordilleras, or Rocky Mountains, in Mexico. They extend north into Arizona and New Mexico. The slopes toward the east are gradual, but there is an abrupt descent on the Pacific side, thus forming marked precipices and grand scenery. In these mountains are silver mines of much value. They rise to heights approximating about 10,000 feet above sea level.

SIERRA MORENA (mō-rā'nā), a mountain chain in Spain, separating Andalusia from New Castile and forming the watershed between the Guadiana and Guadalquivir rivers. The highest peaks rise 5,500 feet above sea level. In these mountains are deposits of lead, quicksilver, lignite, and sandstone. They are mentioned as the scene of several incidents in "Don Quixote."

SIERRA NEVADA (ne-va'da'), a chain of mountains in California, traversing the east central part of that State. It extends from southeast to northwest for 450 miles. The highest peaks are in the southern part, including Mount Whitney, 14,978; Mount Tyndall, 14,386; and Mount Lyell, 13,217 feet. Mount Shasta, in the northern part, is 14,551 feet above sea level. The mountain range has valuable deposits of gold, silver, and other minerals. It is penetrated by many valleys and passes. These include the Tehachapi Pass, in the south; the San Juan Pass, in the central part; and the Truckee Pass, which is traversed by the Southern Pacific Rail-

road to reach the valley of the Sacramento. Extensive forests of deciduous trees abound in the lower slopes and fine coniferous timber is found in the higher sections, extending to a height of 8,000 feet. Among the mountains are numerous valleys of great fertility, especially the Yosemite.

SIERRA NEVADA, an elevated mountain chain of southern Spain, stretching from near Cape Gata westward into Granada. It has the highest peaks of the Iberian Peninsula. Mulahacen, 11,675 feet, is the culminating peak. Its summit is covered with snow perpetually. The scenery is picturesque and there are numerous fertile valleys and deposits of valuable minerals.

SIEYĖS (sē-ā-yās'), Emmanuel Joseph, Count, best known as Abbé Sieyès, noted statesman, born in Fréjus, France, May 3, 1748; died in Paris, June 20, 1836. He studied for the church at the University of Paris, obtained an appointment in Bretagne in 1775, and five years later was transferred to the Cathedral of Chartres. Soon after he become chancellor and vicar general of the diocese. Sievès was extremely liberal in his views on government and issued a number of pamphlets touching on interesting questions involved in the Revolution. In 1791 he was elected to the legislative assembly. He soon acquired marked influence in the national assembly, originating the idea of dividing France into governmental departments, arrondissements, and communes, and in the convention of 1792 recorded a vote for the execution of the king, but refrained from debating the question. In 1799 he suppressed the Jacobin Club and on the return of Bonaparte from Egypt entered into a league with him, from which he resigned because Bonaparte exercised a practical energy that completely outmatched his own. On retiring from public service he was made a count and given an estate valued at \$225,000. He was banished from France at the restoration of the Bourbons, but returned after the Revolution of 1830. He wrote a number of works on civics and economics, and drew a new constitution for France.

SIGEL (sē'gel), Franz, soldier, born in Sinsheim, Germany, Nov. 18, 1824; died Aug. 21, 1902. He graduated at Carlsruhe and entered the service of the Grand Duke of Baden. Subsequently he became involved in the Revolution of 1848 and was compelled to seek safety in the United States, but returned to Germany in 1849 to engage in another insurrection. This enterprise failed also and he fled to Switzerland. In 1851 he went to England and two years later came to the United States. After teaching mathematics in New York City he became professor in a German college in Saint Louis, and at the beginning of the Civil War entered the Union army. He fought with much distinction throughout the war, captured Camp Jackson in Missouri, and took part in the battles of Carthage, Wilson's Creek, Pea Ridge, Cedar Creek, and New Market, and rose to the rank of major general. In 1871 he was made registrat of New York

City. President Cleveland appointed him pension agent for New York and he served in that capacity from 1886 to 1889. He was editor for some time of the Baltimore Wecker, a German newspaper, and later of the New York Monthly. In the meantime he published several works favorable to the establishment of a German republic in Europe.

SIGISMUND (sij'is-mund), Emperor of Germany, born Feb. 14, 1368; died Dec. 9, 1437. He was the son of Emperor Charles IV., and married Marie of Anjou, who ascended the throne of Hungary. In 1387 he was crowned King of Hungary and as such led a large army against the Turks, but was defeated at Nicopolis on Sept. 28, 1396. Soon after he conquered Servia, Bosnia, Herzegovina, and several other regions, and in 1411 became Emperor of Germany. The religious excitement occasioned by the Hussites occurred in the early part of his reign and he is remembered for his promise to protect the life of John Huss by a safe bodyguard, but afterwards permitted him to be burned. The Hussites opposed his succession to the throne of Bohemia and were long in open insurrection against him, but he pacified them by granting considerable political independence. Much of his time was spent in defending Hungary against the Turks, defeating them in a decisive battle near Nissa in 1419. Sigismund was avaricious, but possessed a large intelligence and remarkable political sagacity.

SIGNALS, the means of communicating intelligence by sound or sight. Signals are utilized principally in military operations and for heralding prospective changes in the weather. The first signals used for conveying information to a distance consisted of torches and beacon lights, which served to convey information at night, while flags and other signals were employed in daytime. Ultimately an elaborate system of signals came into general use among the civilized nations in connection with commercial navigation, and in 1857 the international code of signals was devised, which has since gone into general use. In this system are eighteen flags. They are so ingeniously colored and arranged in groups, and there are such well-contrived plans for displaying them, that 78,000 different signals are possible, though only four flags may be used at once. The flags are colored blue, yellow, red, black, and white. The last two mentioned are used chiefly, as they are most easily distinguished at a distance.

Each flag used in the code of signals is designated by a letter. It is suitably colored and designed so that words and terms may be represented. In extremely windy weather figures of wood or iron are drawn up instead of flags, the figures used chiefly being spheres, cones, cubes, and cylinders. Signal books, containing a full exhibit of all the signals and their meaning, are published in the different languages of the nations making use of them, thus supplying a very

practical system for ships in international trade and communication. Electric lights displayed in different colors are used for long distances at night, while five fireballs are shot into the air for short range, green and red being the common colors. It is necessary to signal vessels in fogs and snowstorms, when whistles or horns are blown or bells are rung.

Signals of various kinds are employed in the army and navy, thus facilitating communication between different parts of the army and between warships. Plans of this kind were employed from remote antiquity among the Greeks, Romans, and Phoenicians, and throughout the Middle Ages. The value of a systematic use of signals was recognized in America in colonial times, and signal systems have since been put in a very efficient condition. Congress authorized the purchase and equipment of signal apparatus in 1860, and after the beginning of the Civil War schools were instituted to instruct those who were to accompany the army in the field. Albert J. Myer originated a system of signals of much value. He was given the supervision of field signaling, with the rank of major. Congress provided for reorganizing the signal service in 1866 and in 1870 added a meteorological division, but in 1891 the Weather Bureau was transferred to the Department of Agriculture. The government maintains a school of instruction in military signaling at Fort Riley, Kansas, where instruction is given in photography, electricity, and topography, as well as in the practical use of flags, telephones, lanterns, searchlights, rockets, the heliograph, and other apparatus.

Weather signaling is carried on by the Weather Bureau, which is under the Department of Agriculture. The central station at Washington receives telegraphic communication from all parts of the country three times a day, and from these forecasts for the next 24 hours are made and sent to all sections. Signal flags are displayed in thousands of cities and towns as soon as forecasts are received from Washington, or some other distributing center. In the accompanying illustration are shown the flags used to indicate









WEATHER SIGNALS.

the forecasts of weather and temperature. It will be observed that a black triangular flag serves as a temperature signal; a white-blue flag, local showers; a blue flag, rain or snow; and a white flag, clear or fair weather. To indicate the approach of higher temperature, the black triangular flag is displayed over the weather flag, while a lower temperature is predicted by placing it below the weather flag. Warning of a cold wave is signaled by displaying a white flag with

a black center. The press furnishes valuable means for warning the public, and through it the reports become generally circulated by means of the daily newspapers. Similar systems are maintained in all the leading countries, which, in many instances, communicate with each other.

SIGNAL SERVICE, the branch of the public service of any country as a means to transmit intelligence by signals, especially in the army and navy. Experienced signalists consider that signaling at five miles is at a short range. A rod twelve feet long is sufficient to transmit messages by signals a distance of ten miles. In the military service it is possible, by means of a wellunderstood code, to communicate with an army at a distance of 25 miles. The invention of serviceable balloons has greatly extended the usefulness of signals, and these means have been greatly added to by the use of electric lights and wireless telegraphy. It is well understood that the signal corps plays an important part in a battle, especially if the line of action extends over a distance of 80 to 100 miles. The British signal service is under the jurisdiction of the Royal Engineers Telegraph Corps, which consists of about 250 men and officers. In the United States the Signal Corps consists of 800 men. They are supplied with flags, balloons, signal lights, and various instruments, such as the telephone, heliograph, and the telegraph. More recently wireless telegraph apparatus has been added to the equipment. A school of instruction in signals is maintained at Fort Riley, Kansas.

SIGN LANGUAGE. See Deaf-mutes.

SIGNORELLI (sē-nyō-rěl'lè), Luca, painter, born at Crotona, Italy, about 1471; died in 1523. He studied painting under Piero della Francesca at Arezzo and spent much of his life in the hills of Tuscany. In 1475 he went to Rome, where he painted two frescoes representing events in the history of Moses. Soon after he completed an altarpiece for the cathedral in Perugia. The later years of his life were spent at Cortola, where he lived in luxury and splendor. Many of his productions are in the leading galleries of Europe, including those of Uffizi and Berlin. Among his masterpieces are "The Resurrection," "The Last Supper," "The End of the World," "History of Antichrist," and "Life of Saint Benedict."

SIGOURNEY (sĭg'ēr-nĭ), Lydia Huntley, authoress, daughter of Ezekiel Huntley, born in Norwich, Conn., Sept. 1, 1791; died in Hartford, June 10, 1865. She studied at Norwich and Hartford, taught women's classes in the latter city for five years, and in 1819 married Charles Sigourney. Her first writings appeared in 1815. when she published "Moral Pieces in Prose and Verse" and made numerous contributions to various periodicals. Her leisure hours after marriage were devoted to literature, publishing many interesting poetic and prose writings. She contributed to about 300 different periodicals in the course of her literary life. In 1841 she visited

Europe and the following year published a record of the tour under the title of "Pleasant Memories of Pleasant Lands." Some of her books were widely circulated, both in America and Europe. She is often spoken of as the "American Hemans," owing to the varied and extensive use of her pen. Among her writings are "Letters to Young Ladies," "Water Drops," "Voice of Flowers," "Daily Counsellor," "Traits of the Aborigines of America," "Man of Uz, and Other Poems," and "Letters of Life."

SIGSBEE (sĭgz'bĭ), Charles Dwight, naval officer, born at Albany, N. Y., Jan. 16, 1845. He studied at the Annapolis Naval Academy, where he graduated in 1863 and was assigned for service to the Gulf Squadron. In 1864 he took part in the Battle of Mobile Bay and the following year was assigned to the North Atlantic Squadron, with which he participated in the capture of Fort Fisher. He was placed in command of the battleship Maine in 1897, which was destroyed in the harbor of Havana on Feb. 15, 1898. During the war against Spain he commanded the battleship Texas, and became chief officer of naval intelligence in 1900. He was promoted to the rank of rear admiral in 1904. Several decorations were awarded to him, including that of the Red Eagle of Prussia by Emperor William I. He published "Personal Narrative of the Battleship Maine."

SIGURD (se'gurd), the hero of the *Volsung Edda*, corresponding to the Siegfried of the German *Nibelungenlied*. In northern mythology he is described as the son of Sigmund, who descended from Odin. It is said that he grew to manhood at the court of his stepfather and that he was given the sword of his father, who received it as a gracious gift from Odin. See

Nibelungenlied.

SIKHS (sēks), meaning disciples, the name of a religious sect of northwestern India, whose tenets include the worship of one invisible God. It was founded by Nanak Shah (1469-1539 A.D.), who conceived the laudable plan of unifying all the Hindu castes. His preaching favored universal toleration, encouraged acts of benevolence and self-denial, and advocated equal social and political rights to all men. The Sikh state was founded by Guru Govind, the tenth teacher after Nanak Shah, who made his followers a military power, chiefly to defend the faith against persecutions by the Mohammedans and other religious classes. His adherents were allowed to wear long hair and beards. They had equal recognition in all social and political affairs, and their diet was left largely to the individual taste of each. This teacher compiled the sayings of Nanak and his immediate successors in the two works entitled Adi Granth and Dasema Padshah, which he intended should supersede the Puranas and the Vedas.

The Punjab became the seat of their influence, which they freed from the Mohammedan government in 1792, and Runjeet Singh was made the

ruler of the Sikhs, assuming the title of Maharajah. Multan and other regions were annexed and the territory under Sikh control included about 70,000 square miles, but after the death of Runjeet the Sikh empire came into collision with the British government of India, and the Sikhs were successively defeated in decisive battles in 1845-46. A rebellion occurred in 1848, but they were finally conquered the following year and their possessions were annexed to British India. They supported the British in the mutinies of 1857, chiefly from fear that a Mohammedan empire might be restored. The Sikhs number about 1,875,000 at present, thus forming much the larger part of the inhabitants of the Punjab. They are mainly of Jat origin and engage chiefly in agricultural pursuits.

SI-KIANG (se'kyang), a river in the south-western part of China. It has its source in the province of Yun-nan, has a tortuous course toward the southeast, and, after flowing about 985 miles, discharges into the China Sea near Canton. Several important rivers flow into it, including the Yü-kiang, and it has been improved for navigation by a network of canals. It has an estuary about 75 miles wide and is navigable for some distance by the largest vessels, but extensive rapids obstruct the upper

course.

SILAGE (sī'lāj). See Ensilage.

SILENUS (si-le'nus), in classical mythology, the son of Hermes or Pan and the companion of Dionysus. Originally he was the god of flowing water, but later came to be regarded a jovial man with a bald head and a tendency to become intoxicated. It is said that he despised the gifts of fortune and preferred to practice the arts of wisdom. A temple at Elis was dedicated to him.

SILESIA (sǐ-le'shǐ-à), in German Schlesien, a German province of Europe, now belonging to Germany and Austria. It has a total area of 17,554 square miles, of which 15,566 square miles belong to Germany and 1,988 square miles to Austria. The former is a province in southeastern Prussia, lying south of Posen and Brandenburg, and is divided by the Oder River. The soil is exceedingly fertile and there is an abundance of timber and pasturage. It has deposits of various minerals, including coal, sulphur, lead, copper, iron, and silver. In several sections are mineral springs. Among the soil products are chicory, beet roots, flax, hops, hay, corn, tobacco, wheat, and fruits. The manufactures embrace leather, wine, hardware, glass, sugar, machinery, cotton textiles, woolens, linen and silk goods, and clothing. Breslau is the capital and principal city. The total population of the province in 1910 was 5,226,311. Austrian Silesia is quite mountainous. It has valuable mineral deposits, extensive forests, and manufactures of textiles, machinery, and lumber products. The population in 1910 was 756,590.

Silesia was occupied by German tribes at the

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beginning of the Christian era. They moved westward in the 6th century and the region became populated with Slavonians. After belonging to Moravia and Bohemia, it became part of Poland in the 10th century. In the 14th century it was divided into a number of 'small states that were annexed to Austria in 1526. Frederick II. of Prussia laid claim to it in 1740 by virtue of an agreement made by the Duke of Liegnitz in 1537, to the effect that the Elector of Brandenburg should secure sovereignty over it in case the former left no direct heir. Three destructive wars between Prussia and Austria followed. The first occurred in 1740-42, the second in 1744-45, and the third in 1756-63. The last mentioned is generally termed the Seven, Years' War (q. v.).

SILICA (sil'i-ka), a compound formed of oxygen and silicon. The latter is an abundant nonmetallic element and enters into the composition of many rocks. Silica is one of the most widely distributed materials, occurring either in amorphous masses or in a crystallized form. It forms a constituent part of rocks and enters largely as a productive element into many soils, serving as an important food for various plants. Though not soluble in pure water, it is held in solution by water, and enters into the structure of animal and vegetable tissues. It is known as rock crystal, when it is in a native crystalline state, and as amethyst, when its crystals are of a delicate purple color. Silica occurs in the form of carnelian and chalcedony and as a constituent of opal, mica, agate, feldspar, serpentine, and hornblende. In various forms it is valuable as a stone and enters into the manufacture of porcelain, glass, and a number of hydrates which yield salts known as silicates.

SILICON (sīl'ī-kun), or Silicium, a non-metallic element, the most abundant one, next to oxygen, that abounds in the crust of the earth. It is insoluble in water, but dissolves readily in hydrofluoric acid or a warm solution of potash. Powdered silicon is a nonconductor of electricity. When heated in air or oxygen, it burns brightly and with such intense heat as to fuse the external crust of silica. It is obtained in a dull brown powder by passing the vapor of chloride of silicon over heated potassium contained in a glass tube, or from the aqueous solution of the gaseous fluoride of silicon.

SILK, a delicate fibrous substance produced by many insects, but especially by the larvae of silkworms to form their cocoons. The silk of commerce is obtained chiefly from the common silkworm (q. v.). To obtain the silk, the cocoon is taken from the twig to which it is fastened before the moth commences to eat its way out, and is placed in warm water. This not only kills the moth, but also softens the gum that holds together the threads of silk. The silk is spun backward and forward to cover the whole cocoon, not wound around it like thread on a spool, and after being soaked can be easily loosened and placed on a reel. The vat containing the hot

water usually has four parts, in each of which a quantity of cocoons is placed, and from each part one thread is taken, thus joining the ends of four different threads. Connected in this way, they are drawn through guides to large reels moved by machinery and wound as one thread. When one of the filaments has been taken from a cocoon, another is put in its place, thus forming a continuous thread. The silk on the outside of the cocoon, called floss silk, is of poor quality, but when about one-half is unwound the thickness decreases fully 50 per cent. and the silk assumes the finest quality. Much of the gummy matter is taken off when put on the reeling machine, but the part still remaining is afterward removed, and the threads are wound on bobbins.

Silk is ready for the weaver when it has undergone a process called throwing. This involves unwinding it from the bobbins, twisting it in a machine, and preparing threads for spinning and weaving. The process depends largely upon the articles to be manufactured, for which purpose the silk is carefully selected and the threads are variously made. Singles are used in weaving plain silk and ribbons, and doubletwisted is employed in making warps. Raw silk obtained from the cocoon is of a bright yellow color, but it is variously dyed in the process of manufacture. Formerly the waste materials accompanying the unwinding of the cocoons and the twisting of the threads were considered useless, but a process was discovered in 1857 by which the outer silk of the cocoons, defective cocoons, and ordinary waste resulting from handling may be utilized profitably. Silk weaving from the prepared thread is a process quite similar to the weaving of woolen and cotton fabrics.

It is thought that the manufacture of silk fabrics originated in China, whence it was introduced into Europe and finally brought to America. The wife of a Chinese emperor is credited with unwinding the first cocoon in 2600 B. C., and for centuries the industry was guarded carefully lest other countries should enter into competition. Several Persian monks are said to have carried the eggs of silkworms from China to Constantinople in a hollow cane about 530 A. D., and soon after marked interest was given to silk culture in Southern Europe. Spreading rapidly from Constantinople into Greece, Sicily, Italy, Spain, and France, it has continued to form an important industry in Southern Europe until the present. Little progress was made in Great Britain until in 1685, when the Edict of Nantes caused many silk weavers to leave France and seek refuge in England. An effort to introduce silk culture into the American colonies was made by James I., who sent eggs to Virginia and offered rewards for the production of raw silk. However, tobacco proved more profitable and little progress was made until about the middle of the last century, when several associations were formed to promote silk culture in New Jersey, the Carolinas, Florida, California, and other

states. Large quantities of raw silk have been imported into the United States for many years, which, aided by home production, have greatly stimulated domestic manufactures. In 1860 only 13 per cent. of the silk used in the United States was of American manufacture, but in 1880 it reached 30 per cent.; in 1890, 55 per cent.; and in 1900, 85 per cent.

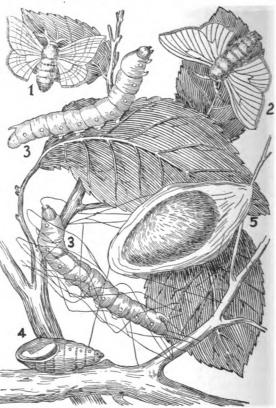
The importations of silk goods into Canada and the United States are now chiefly fine products. They come principally from the hand looms of Crefeld, Zurich, and Lyons. China alone produces about one-half the raw silk of the

world, and Japan and Italy take the next rank. Considerable quantities are manufactured in France, Germany, Austria, Turkey, Greece, Spain, India, and Persia. It is estimated that about one-third of all the raw silk produced in the world is handled in the mills of the United States, the largest importations being from China, Italy, Austria, France, India, and Japan. At present there are about 650 silk factories in that country, most of which are in New Jersey, New York, and Pennsylvania. They produce products annually that have a value of \$115,526,500. The annual importations of raw silk are valued at \$35,500,000 and the amount annually consumed is correspondingly large. The present rate of progress in sericulture gives reasonable assurance that the United States will within a comparatively short time produce the greater portion of raw silk consumed in its factories.

SILK, Artificial, a manufactured product which resembles pure silk, now used to some extent as a textile. It is made chiefly of cellulose prepared from cotton and the pulp of soft woods. The cotton is carefully carded into wadding before being treated with a mixture of nitric acid and sulphuric acid, in the proportion of 15 parts of the former to 85 parts of the latter. By this process the cotton is converted into nitrocellulose of a clear blue color, after which it is pressed and carefully washed, and is then formed into collodion by dissolving in a preparation of ether and alcohol. After standing in this form for several weeks, it is run between steel rollers and forced through minute tubes into greatly diluted nitric acid, which causes the streams of collodion to be converted into fibers. The fibers are then reeled, are dried by warm air, and are subjected to several washing and drying processes, after which the threads are ready to be spun and dved like pure silk. This product, though elastic and lustrous like natural silk, is less durable. It can be produced at about one-third the cost of real silk.

SILKWORM, the larva of a moth that produces a dense silken cocoon of value commercially. The silkworm cultivated almost univer-

sally came from northern China, being a moth of the family Bombycidae, but there are about 400 species, though some are not valuable in silk culture. The body of the silkworm is thick and hairy. In a mature state it is about an inch long and has stout legs, and the large wings are marked with dark lines. The body of the female is larger than that of the male, and both die soon after the female deposits its eggs. These are about the size of a mustard seed and are fastened to the leaf of a mulberry tree, or some other object, by a gummy substance. The eggs may be kept a long time in a dry, cool place. They



SILKWORM.

1 Male Moth; 2, Female Moth; 3, 3, Silkworms; 4, Chrysalis; 5, Cocoon.

hatch soon after coming into a warm place, and the young insects feed with remarkable greed on the leaves of the mulberry tree. They remain in the caterpillar state from six to eight weeks, in which time the skin changes four times, and the body finally assumes an ashy color and a length of nearly three inches. In the body are twelve segments, six anterior or forelegs, ten fleshy legs in the hind part of the body, and a large mouth.

The young insects stop eating about the fifth week and find a suitable place to spin their cocoons, which they prepare from silk threads



1, Mulberry branch; 2, Moth laying eggs; 3, Second-molt worm; 4, Fourth-molt worm; 5, Full grown worm; 6, Male moth; 7, Female moth; 8, Open double cocoon; 9, Moth emerging from cocoon; 10, Cocoon; 11 Pupa in cocoon; 12, Raw manufactured silk; 13, Manufactured silk.

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produced by their own bodies. These threads are made from a glutinous substance secreted by two tubular glands near the mouth, one on each side of the body, the gum being drawn through a single tube at the upper lid and spun into silk. In this way the thread of silk is made to consist of two strands and varies in length from 250 to 300 yards. From three to five days are required to complete the cocoon, and after finishing it the insect assumes a waxy-white color and soon forms the second stage of life, or the pupa state. In this pupa or chrysalis stage it remains about three weeks, when it emerges as the imago, or perfect moth. Insects designed to supply silk material are not allowed to develop into the perfect moth, but are thrown into warm water and killed, while the silken threads are unwound and used in the manufacture of thread and fabrics. The moth produces from 300 to 500 eggs. One ounce of eggs produces 100 pounds of cocoons, while twelve pounds of cocoons yield one pound of raw silk. Among the conditions necessary for successful silk culture are pure air, warmth, and suitable food. Thrifty mulberry trees are essential, the most valuable being a species of the white mulberry. The annual production of raw silk in the world is estimated at 48,500,000 pounds. See Silk.

SILKWORM GUT, a material prepared from the viscid secretion found in the body of a young silkworm, immediately before it begins to spin the cocoon. The insect is submerged in vinegar for several hours, and the substance is then extracted from the dead body. By soaking in a caustic solution the thread becomes loosened and may be removed easily. It is used for the manufacture of gut, which is employed extensively in making lines for anglers.

SILLIMAN (sīl'lī-man), Benjamin, author and physicist, born in Trumbull, Conn., Aug. 8, 1779; died Nov. 24, 1864. He graduated from Yale University in 1796 and was admitted to the bar in 1802. Soon after he became professor of

Yale University in 1796 and was admitted to the bar in 1802. Soon after he became professor of chemistry at Yale University, a chair held by him for many years. Besides taking advanced work in Philadelphia, he visited Great Britain, Holland, and other European countries to pursue study in physical sciences. In 1807 he took part in a geological survey of Connecticut, observed the fall of meteors, and invented a compound blowpipe. The American Journal of Science and Arts was founded by him in 1818. He contributed articles on scientific subjects to other periodicals and many works of reference. In 1851 he made a second extensive visit to Europe, of which he published an account under the title "Visit to Europe," and in 1855 lectured for the last time at Yale. Besides publishing a number of text-books on scientific subjects, he edited an edition of Bakeswell's Geology. He was succeeded as a lecturer in Yale University by his son, Benjamin Silliman. The latter was born in New Haven, Conn., Dec. 4, 1816; died there June 14, 1885. He graduated from Yale University in 1837 and was professor in that institution from 1854 to 1885. He published "First Principles of Chemistry," "Progress of Science and Mechanism," and "American Contributions to Chemistry."

SILURIAN SYSTEM (st-lū'rĭ-an), a division of the rocks of the Paleozoic group, preceded by the Cambrian and followed by the Devonian systems. It is so named from the Silures, a people of ancient Britain, the name being first applied by Murchison. Two more or less clearly defined formations make up the division, known as the Lower Silurian and the Upper Silurian, but the former of these is usually designated as Ordovician by English geologists. Silurian rocks are found in all the conti-They are especially abundant in the eastern part of North America, extending from Quebec southward through New York, Maryland, and Tennessee. They are especially prominent at Niagara Falls, at the Delaware Water Gap, and in the Kittatinny Mountains. Other deposits occur in Georgia, Nevada, and the Black Hills. Although fossils of seaweeds are abundant, the land plants are not well represented. Invertebrate animals were very numerous and of large size during the time these rocks were formed. Many minerals occur within the deposits, such as rock salt, gypsum, and hematite iron ore.

SILVER, a precious metal. It is found in the native state and in combination with many other elements, among them gold, sulphur, arsenic, antimony, chlorine, lead, and copper. Early writings make it certain that silver was known to the ancients as early as gold. This is due probably to the circumstance that silver is often associated in a natural state with gold, and that both may be fused at an ordinary heat. Pure silver is the most brilliantly white metal and is exceeding malleable and ductile. It is softer than copper, but is harder than gold, and takes a fine polish. Silver may be beaten into sheets of only one-hundred-thousandth of an inch in thickness, and drawn out into a wire finer than a human hair. As a conductor of heat and electricity it excels all other metals. It has a specific gravity of 7.14 and a density of 10.5. The melting point is about 1,832° Fahr.

Silver does not tarnish on being exposed to the air, thus forming an important metal for plating articles and in the manufacture of jewelry and tableware. It is employed extensively in coinage and glass staining, in making compounds useful in photography, and in forming many alloys. When the silver ores do not contain lead, the silver is extracted by amalgamating it with mercury and driving off the latter by the action of the heat. Several complicated processes are utilized in extracting silver. In all of them the silver is first converted into silver chloride, and the metal is set free from the chlorine by amalgamation. When the silver ores contain lead, it is extracted by smelting. This method is

based on the affinity that silver has for lead; the latter, acting as a solvent, serves to extract the silver from baser metals united with it. Later the silver is separated from the lead by cupellation, the silver remaining intact while the lead is formed into an oxide.

Silver was secured almost entirely from regions producing it in the native state, or nearly pure, up to about the middle of the 19th century. but since then newer discoveries of silver in combination with other minerals have led to the adoption of methods of mining and extracting that resulted in utilizing the silver ores of much lower grade than were formerly thought to be of utility. The world's supply of silver was secured chiefly from Mexico and South America prior to that time, but since then Canada and the United States have become important in the production of silver. Germany is the largest silver-producing country of Europe. Its mines have taken high rank since 1623, and large bulks of native silver have been secured from its deposits. Considerable quantities of silver are obtained in Bohemia, Norway, Spain, and Hungary, but the most important mines in the world are those of North and South America.

A silver mine in Nevada, known as the Comstock Lode, is one of the first great silver mines of the United States and ranks as one of the most valuable. Since its discovery, other vast veins and deposits of silver have been found, including those at Leadville, Colo.; the Coeur d'Alene, Idaho; Granite Mountain, Mont.; Eureka, Nev.; and Kingston, N. M. Besides these are many other noteworthy deposits and mines, all containing more or less gold, iron, sulphur, and other elements in connection with the silver. The rank taken by the leading silverproducing states is usually in the following order: Colorado, Montana, Utah, Idaho, Arizona, Nevada, California, New Mexico, Texas, Washington, South Dakota, and Oregon. Canada is now one of the leading silver-producing countries, the most extensive mines being in Ontario and British Columbia.

Mexico has first rank in the production of silver, producing more than any other country in the world. The most important mines are in the state of Zacatecas, which have been worked about 200 years. Large masses of silver are secured in the Andean countries of South America, particularly Peru, and in New South Wales and other provinces of Australia. The world's output varies greatly in value, owing to the fluctuations in the price of silver. Australasia produces almost 14,500,000 ounces per year. In 1915 the total value was \$130,360,980, which is about the annual average. In that year the world's output was 198,399,288 ounces. The eight leading silver-producing countries were:

United States80,505,000 Mexico70,680,000 Canada60,000,500	Bolivia
Peru30,500,800	Japan3.208.690

SIMCOE (sim'kō), a lake of Canada, in Ontario, situated between Georgian Bay and Lake Ontario. It is 30 miles long and 18 miles wide. The surface is 128 feet above Lake Huron, into which it discharges through the Severn River and Georgian Bay. The area is 160 square miles. Within the lake are many islands, and fine forests occur in the vicinity. Fishing and boating are good. In the winter it freezes over so firmly that it can be crossed with teams.

SIMCOE, John Graves, soldier, born at Cotterstock, England, Feb. 25, 1752; died Oct. 26, 1806. He studied at Merton College, Oxford, and came to New England at the time of the Revolutionary War. In the battles of Brandywine and Monmouth he was wounded. He surrendered with Cornwallis at Yorktown in 1781. He was made the first Governor of Upper Canada in 1791, in which office he did much to extend the influence of the Loyalists who emigrated from the United States. In 1796 he became Governor of Santo Domingo, was promoted to the rank of a lieutenant general in 1798, and received the appointment of commander in chief of India in 1806, but illness prevented him from going to Asia. Lake Simcoe and several localities in Ontario were named in his honor.

SIMILE (sim'i-le), a figure of speech, consisting of a word or phrase by which anything is likened to something else, in one or more of its aspects. The comparison in a simile is pointed out by certain words, such as like of as. Similes please because we are disposed to compare objects with one another, and statements are embellished and impressed more forcibly on the mind. They should not be drawn from things which have too near an obvious resemblance to the object compared, nor from objects which present a likeness too faint and remote. Metaphor resembles a simile, but differs from it in that we directly substitute the action or operation of one object for that of another. The sentence, "He is the pillar of the state," is a metaphor; while, "He upholds the state, like the pillar which upholds an edifice," is a simile.

SIMMS (simz), William Gilmore, poet and novelist, born in Charleston, S. C., April 17, 1806; died there June 11, 1870. He was of Scotch-Irish descent and began to write verses at the age of eight years. After clerking in a drug store, he studied law and became a member of the Charleston bar in 1827, but soon devoted his entire time to journalism and literature. He was connected with the City Gazette in 1828, in which he published a number of editorials against the doctrine of nullification. Many of his novels have their plot in the American Revolutionary period, and he collected and published numerous historical and pioneer incidents. His best known writings embrace "Lyrical and Other Poems," "Tricolor, or Three Days of Blood in Paris," "Damsel of Darien," "Southern Passages and Pictures," "South Carolina in the Revolution," "Atalantis, a Tale of the Sea," and "The Vision of Cortez." The University of Alabama conferred the law degree upon him. He was for some years a member of the State Legislature. In 1846 he was defeated by one vote for lieuten-

ant governor of South Carolina.

SIMON (sē-môn'), Jules François, statesman and economist, born in Lorient, France, Dec. 31, 1814; died in Paris, June 8, 1896. He studied successfully in his native city and at Vannes, and then took a course of instruction at the Sorbonne in Paris under Victor Cousin. He succeeded the latter as lecturer at the Sorbonne in 1839, when he became noted as an instructor and writer on philosophic and economic questions. Shortly after the Revolution of 1848 he was made a member of the chamber of deputies, but refused to take the oath of allegiance to the empire on the accession of Napoleon III. His eminent scholarship and ability made him a leader of the republicans, and after the establishment of the present republic he became minister of public instruction. In 1875 he was elected a member of the French Academy and was made senator for life. The following year he was chosen prime minister, but resigned in 1878 on account of his advanced views in relation to the freedom of the press. He became permanent secretary of the Academy of Moral and Political Science in 1882, and in 1890 took part in the labor conference in Berlin, where he was presented with a collection of the musical works of Frederick the Great by the emperor. His writings include "Natural Religion," "Government of Thiers," "Liberty of Conscience," and "Liberty." He edited the He edited the works of Descartes, Bossuet, Arnauld, and Malebranche.

SIMON MAGUS (sī'mon mā'gus), meaning Simon the Magician, an individual mentioned in the Acts of the Apostles. It appears that he flourished in Samaria about 37 A. D., where he was a person of considerable prominence and influence. At the time Philip the Evangelist came to Samaria, many of his followers were converted, and Simon Magus also consented to be baptized. When Peter and John came to Samaria to impart the Holy Ghost to the baptized by the laying on of hands, Simon was greatly astonished and offered the apostles money to invest him with a like power in conferring the gift. For this he was thoroughly rebuked by Peter, who exhorted him to repent and seek forgiveness from God.

Justin Martyr gives a much fuller account of Simon than is found in the Acts of the Apostles. He states that Simon was born in Gittha, in Samaria, and that he came to Rome in the reign of Claudius. While there he gained some followers by exercising magical arts. It appears that a statue was erected to his memory in Rome, where he was not only identified with the teachings of Christ, but entered into connection with the legends of Greek origin and

the worship of Zeus. Many of the stories connected with him are of uncertain origin, but it is quite well established that he introduced a system of religious worship ranging between Greek and Christian worship, which long held a place among a limited number of followers. It was commonly known as Simonianism,

SIMOOM (si-moom'), or Simoon, a name of Arabic origin, applied to the hot, suffocating winds that frequently occur in the desert regions of Africa and Western Asia. These winds are caused by ascending currents of air due to the extreme heat over the sandy surface and to the influx of colder air from all sides, thus forming movements of air similar to a cyclone. In many regions of Arabia and Africa the surface becomes heated to 200° Fahr., thus giving it a peculiar dryness. The winds resulting from this greatly diversified temperature bear with them intense heat, choking dust, and even coarse gravel. They often prove destructive to animal life and vegetable forms. In some regions vast mounds of sand are transported and, when coming in contact with a storm of this kind, many persons accompanying caravans lose their lives. It is supposed that a simoom overtook the army of Cambyses, when crossing the desert to secure the riches from the temple of Jupiter Ammon, and that he and 50,000 of his troops perished. Simooms are most common in the spring and summer. They are greatly modified by the character of the surface of the region over which they pass. When of vast extent, they remarkably affect the movement of the air in neighboring regions.

SIMPLON (sim'plon), a pass in the Alps of Switzerland, near the boundary between Valais and Piedmont, Italy. The highest point is 6,592 feet above sea level. It was made famous by Napoleon I., who constructed a military road through it in 1800-06. This road was 42 miles long by 30 feet wide and contained several tunnels and 610 bridges. In 1898 the Simplon Tunnel was commenced between Brig and Isella, and was fully completed for use in 1905. It is about 12 miles long and has two passageways, each containing a single railway track. This tunnel surpasses the Saint Gotthard by about two miles and is the longest railroad tunnel now in

SIMPSON (simp'sun), Sir James Young, eminent physician, born in Bathgate, Scotland, June 7, 1811; died May 6, 1870. He studied at the University of Edinburgh, where he was generally admired for industry and successful study, and after graduating, in 1832, became a professional assistant to one of the professors. In 1840 he was made a full professor at the university, and by indefatigable labors greatly extended the reputation of that institution. He read an exhaustive paper on the use of chloroform as an anaesthetic in 1847, which was instrumental in causing the general adoption of chloroform in medical practice. Among the honors

bestowed upon him are the gold medal of the French Academy, in 1856, and honorable recognition by many scientific societies of Europe and America. He was made a baronet in 1866, and a statue was erected to his memory in 1877. His chief writings are "Clinical Lectures on the Diseases of Women," "Selected Obstetrical Works," and "Anaesthesia and Hospitalism."

SIMPSON, Jeremiah, statesman, born in New Brunswick, Canada, in 1842; died Oct. 23, 1905. He was brought to Oncida Courty, N. Y., at the age of six years, where he attended the public schools. When a youth he took up the life of a mariner, and by diligent application rose to the captaincy of vessels on the Great Lakes. In 1878 he removed to Kansas, where he became influential as a leader i.. the Populist party. He served two terms as a member of Congress, in which he took a prominent part as a debator. The ame Sockless Simpson was applied to 1 im, owing to the circumstance that he avowed to go barefooted if a certain measure

failed to pass.

SIMPSON, Matthew, Methodist Episcopal bishop, born in Cadiz, Ohio, June 20, 1811; died in Philadelphia, Pa., June 18, 1884. He was educated in the Pennsylvania Madison College and afterward studied medicine, but subsequently entered the ministry of the Methodist Episcopal Church. In 1837 he was rade professor of natural history at Allegheny College. years later he became passident of the Indiana Asbury University, now De Pauw University, and in 1852 was made a bishop. He went abroad to 'ravel in Eurasia in 1857, and, on returning, in 185., became president of the Garrett Biblical Institute, Illinois. In 1870 and 875 he made visits to Europe and served as a delegate to the Methodist Ecumenical Council in Europe, in 1881. Simpson was noted as an able pulpit orator and lecturer. He was held in high esteem by President Lincoln and officiated at his funeral. He published a number of works, among them "Cyclopedia of Method-ism" and "One Hundred Years of Methodism."

SIMS (simz), George Robert, author born in London, England, Sept. 2, 1847. Hc studied at Hanwell College and at the University of Bonn, Germany, and engaged as journalist. In 1874 he began writing sketches for the Dispatch, contributing "Three Brass Balls," "Social Kaleidoscope," and "Theater of Life." Subsequently he was engaged on the London Daily Times, for which he wrote much on the condition of the poor and drew graphic descriptions of the darker sides of London life. His chief writings include "Ballads of Babylon," "How the Poor Live," "Stories in Black and White," "Ballads and Poems," "Crutch and Toothpick,"
"Two Little Vagabonds," "A Scarlet Sin," "In Gay Piccadilly," and "In the Ranks." He edited, in 1902, "Living London."

SIMS, James Marion, surgeon, born in Lancaster County, South Carolina, Jan. 25, 1813;

died in New York City, Nov. 13, 1883. After graduating at the South Carolina College, in 1832, he studied medicine in Charleston and Philadelphia, and subsequently entered upon a successful practice at Montgomery, Ala. While there he introduced new operations and instruments in the medical practice, and was especially successful in treating clubfeet, lockjaw in infants, and strabismus. He was president of the American Medical Association. Among his published works are "Clinical Notes on Uterine Surgery" and "Silver Sutures in Surgery."

SIMS, William Snowden, naval officer, born in Port Hope, Canada, Oct. 15, 1858. He studied at Annapolis, where he graduated in 1880, and entered the naval service of the United States. For three years, beginning in 1887, he was naval attaché at Paris and St. Petersburg, and in 1909 was inspector of target practice in the Bureau of Navigation. He commanded the Minnesota in 1909-1911, was made commander of the Atlantic torpedo flotilla in 1913, and in 1917 was put in command of the United States naval forces in Europe, with the rank of vice-admiral.

SINAI (sī'nā), a mountain region of northwestern Arabia. It occupies a peninsula in the Red Sea, its western shore being washed by the Gulf of Suez and its eastern by the Gulf of Akabah. The highest peak rises 8,552 feet above sea level, but there are three general groups, all of which cover a region that extends about seventy miles from north to south. These mountains are formed of granite, sandstone, and limestone, and in many places are extensive caves with inscriptions dating from various periods in history. The whole region has a peculiarly desolate appearance when viewed from the higher altitudes, but in some places are valleys containing fine pasture lands and palms and The inhabitants are principally other trees. Arabs, who lead a nomadic life and engage chiefly in rearing goats and sheep and cultivating fruit and vegetables. In the eastern part is Mount Jebel Katherine, height 8,160 feet. It towers considerably above the surrounding mountains in two peaks, the southern being known as the Mountain of Moses and the northern, as Mount Horeb. It is thought that the former peak is the one on which Moses received the Ten Commandments and the other laws by which the Israelites were bound to the obedience of God and the observance of rites. The Church of Saint Katherine was founded at its foot by Emperor Justinian about 527, and besides it there are several other chapels and churches at which pilgrims worship.

SINDH (sind), or Sind, a province in the western part of British India, adjoining Baluchistan, forming part of the Bombay Presidency. It has an area of 47,066 square miles. Agriculture is carried on almost entirely by means of irrigation, the water being secured by means of canals connected with the Indus River. In most places the soil is sandy and impregnated

with alkali, but the delta of the Indus is sufficiently watered and highly fertile. The inhabitants consist largely of Baluchis and Juts, a race of Hindus, and settlements of Afghans are maintained in the northwest. Karachi is the capital. Population, 1906, 3,612,238.

SINDIA, or Scindia, the name of a ruling family of India, constituting a powerful line of Mahratta princes. The rulers of this line descended from Ranoji Sindia, a native of low caste, who rose to a high rank and received as a fief half of the province of Malwa in 1743. He died in 1754 and was succeeded by his son, Madhoji Sindia, who became the virtual ruler of India. His army was disciplined by Frenchmen and he captured Gwalior, Delhi, and Agra. He was succeeded by a number of powerful princes, but the influence of the dynasty rapidly declined.

SINDING, Christian, composer, born at Kongsburg, Norway, in 1856. He studied under Reinecke at the Conservatory of Leipsic, Germany, and later at Dresden and Berlin. Subsequently he became a teacher and organist in Christiania. He is the composer of many quartets, quintets, and symphonies, many of which are popular on the continent and in America.

SINGAPORE (sǐn-gà-pōr'), meaning Lion City, a seaport of Asia, situated on a small island off the southern shore of the Malay peninsula. The island is separated from the mainland by a narrow strait, and is one of several forming the British Straits Settlements. These islands have a generally fertile surface and a hot climate and produce sugar cane, nutmegs, pepper, cloves, ginger, tropical fruits, and vegetables. Formerly the island was the site of the capital of a Malayan kingdom, but it was captured and destroyed in the 13th century. Singapore was founded in 1819 to facilitate trade in the East Indies and now ranks as an important commercial center. The streets are regularly platted and well improved. It has a fine and safe harbor. Among the principal buildings are several cathedrals, Hindu temples, Mohammedan mosques, and Chinese joss houses. It has a number of hospitals, secondary schools, a museum, and zoölogical and botanical gardens. The newer improvements include electric lighting, pavements, public waterworks, sewerage, and rapid transit. On its streets may be seen a peculiar medley of Chinese, Hindus, Malays, Jews, Armenians, and Europeans. Population, 1916, 338,864.

SINGING, the art of uttering musical inflections or modulations of voice, or to produce music with the human voice. It depends in part upon training in the musical art, but to a considerable extent upon the physical development of certain organs of the body. The muscles of the chest and diaphragm are called into a complexity of action by singing, and the character of the tones is modified by the nasal chambers and the cavity of the mouth. However, the

larynx, which contains the vocal cords, is of primary importance, since the length and form of the cords give pitch and some shades of quality to the voice. Air is taken in and expelled by the lungs through the muscles, and by this means sound is produced as the currents of air pass through the throat and act upon the vocal cords. No single individual is able to embrace the entire compass of the human voice, which ranges from C below the bass clef to F above the treble. Four parts are generally recognized in singing, these being the soprano, alto, or contralto, tenor, and bass.

The soprano begins at about E on the treble clef and includes the highest tones; the alto, or contralto, ranges from G on the bass clef to C on the treble clef; tenor extends somewhat lower than the contralto; and bass begins about C above the bass clef and includes all the lower tones. The average human voice has an extent of about twelve tones, but in trained singers the range is from two to three octaves. Two general divisions have been made of women's voices, the soprano and contralto, and three of men's, the tenor, barytone, and bass, these ranging from

the highest to the lowest pitch.

SINGLE TAX, a term used by Henry George in his "Progress and Poverty" scribe a theory of taxation. It embraces the economic reform of raising all municipal, county, state, and national revenues by a single tax on land values. The author of the work contended that other taxes should be abolished gradually until at length all the expenses of the government will be derived from the single tax. He maintained that such a system, when once understood and applied, would greatly simplify government as well as provide that the burden of public expenditures be borne equitably by all individuals. The claim of its supporters is that it will operate to lighten taxation on the agricultural districts, where land has a comparatively small value in relation to that of towns and cities, in which the real property rises to an enormous value without bearing the proportion of taxes properly to be derived from such districts. It is argued that a large number of officers and taxgatherers who are now employed could be dispensed with, and that they would naturally seek to develop some wholesome enterprise in their respective communities. On the other hand, it is claimed that fraud and inequality would be abolished, trusts and monopolies would be avoided, and trade would be given perfect freedom to expand as the communities develop, instead of being restricted by a multiplication of taxes.

The single tax is to be levied on the land in proportion to its utility and without regard to its improvements, thus making it unprofitable to hold vacant tracts at enormous prices for speculative purposes, and as a result all such tracts in cities and agricultural districts would be thrown open to labor. Another contention

is that private ownership of land inclines to hold mankind in a condition of slavery, this view being taken because wealth is the result of labor applied to land, thus bringing the laborer to the mercy of the landowner. Hence, lands are not to be owned by individuals, but they are to be used at specified terms by the occupants. With this change in our economic system the supporters of the single-tax theory include the government ownership and operation of telephones, telegraphs, street railways, railroads, waterworks, and all similar enterprises. Besides, all excise and tariff taxes are to be abolished. The theory of a single tax has never been practically tested, but it has been partially applied in New Zealand and several other countries. Adherents to the single-tax theory have found their way into the Congress of the United States and the legislative bodies of other countries, and their views have been attracting greater interest from time to time, either in whole or in part.

SING SING. See Ossining.

SIOUAN (soo'an), the name of a group of Indians found in North America. These natives occupied the greater portion of the plains at the time North America was discovered, but scattered bands had settlements which extended to the Gulf of Mexico and eastward to the Alleghenies. They penetrated far into Canada, from central Ontario to the Rocky Mountains, but were represented by the largest numbers in the south central part of the Dominion. The Siouan Indians were hostile to the whites, resisting encroachment upon their territory with marked bravery and determination. Among the principal tribes may be mentioned the Sioux, or Dakota, the Winnebago, the Ponca, the Osage, the Omaha, the Flathead, the Assiniboin, and the Mandan Indians.

SIOUX (soo), or Dakota, one of the largest tribes of Indians in North America, originally inhabiting the region west of the Mississippi, from the Arkansas River to Lake Winnipeg. They joined the British in 1812, but soon after concluded peace with the United States. In 1837 they ceded lands along the Mississippi and made further grants in 1851. Hostilities arose soon after because the government failed to keep its treaties with them, and in 1862 about 1,000 whites were killed in the vicinity of New Ulm, Minn. The public authorities promptly reduced them and executed forty of the leaders, but the uprising and damages inflicted cost the government about \$40,000,000. Several bands fled to the Territory of Dakota, while others found refuge in Canada. The government established a reservation near Yankton, S. D., and provided facilities to enable many of the Indians to engage in farming and stock raising. Sitting Bull remained dissatisfied and went to Washington, D. C., to secure a settlement of the differences, and afterward headed an uprising that terminated in the defeat and death of General Custer in 1876. The Sioux Indian tribe is still one of the largest, numbering about 25,000, and they are noted for their physical strength and skill in horsemanship. Many have made material advancement educationally and in the industrial arts.

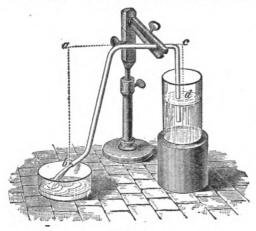
SIOUX CITY, a city in Iowa, county seat of Woodbury County, on the Missouri River, 158 miles northwest of Des Moines. It is on the Illinois Central, the Chicago and Northwestern, the Great Northern, the Union Pacific, and the Chicago, Milwaukee and Saint Paul railroads. It occupies a beautiful site on the bluffs of the river, which is spanned by several bridges, connecting it with South Sioux City, Neb. Among the principal buildings are the high school, the county courthouse, the Union Depot, the Federal building, the Lutheran Hospital, the city hall, the public library, the Saint Joseph's Mercy Hospital, the Y. M. C. A. building, the public library, and many fine churches. It is the seat of the Morningside College and of the Sioux City College of Medicine. Floyd Memorial Park, a tract of twenty acres, extends along the river.

Sioux City has a large jobbing and commercial trade. It has extensive railroad shops, foundries, breweries, and meat-packing establishments. Among its general manufactures are agricultural implements, furniture, starch, flour, stoves, soap, hardware, clothing, brick, and cured meat. The streets are well graded and many have been paved with brick, asphalt, or macadam. Waterworks, sanitary sewerage, and electric street railways are among the public utilities. The place was platted in 1854 and incorporated in 1857. Population, 1910, 47,828.

SIOUX FALLS, the largest city of South Dakota, county seat of Minnehaha County, on the Big Sioux River, sixty miles northeast of Yankton. It is on the Illinois Central, the Great Northern, the Chicago and Northwestern, the Chicago, Milwaukee and Saint Paul, and the Chicago, Rock Island and Pacific railroads. It is surrounded by a fertile farming and stockraising country. In the vicinity are deposits of red granite and from quarries shipments are made to many points in the central west. Among the noteworthy buildings are the county courthouse, the high school, the State and Federal prisons, the public library, the post office, and many churches. It is the seat of the Norwegian-Lutheran College, the Sioux Falls University, the All Saints' School, and the State school for deaf-mutes. Immense water power is supplied by the falls on the Big Sioux River, which descend about 100 feet. It has manufactures of machinery, flour, stone products, and farming implements. It was settled in 1867 and incorporated as a city in 1883. Population, 1905. 12,283; in 1910, 14,094,

SIPHON (sī'fon), a bent tube with limbs of unequal length, used for drawing liquids from one vessel into another. A common siphon is

shown in the illustration. When the shorter limb (c, d) is immersed in the water of the glass vessel and the tube is filled with the liquid by suction or otherwise, the water flows out of the vessel because of the greater weight in the longer limb (a, b) until the liquid in the lower vessel is at a level with the surface of that in the vessel from which it is drawn. The shorter limb is kept full by atmospheric pressure, and



SIPHON.

thus the height over which the liquid may be raised is restricted, lessening as the liquid decreases. It is possible to siphon water to a height of 32 feet, but denser liquids cannot be successfully siphoned to that height, unless pressure is put on the surface containing the shorter limb. The siphon is used for various purposes, especially in racking wines and liquors, in drainage, and in aqueducts.

SIREN (sī'rĕn), an instrument used to produce musical sounds and to aid in ascertaining the number of sound waves or vibrations per second which produce a note of a given pitch. The simple siren is a revolving disk with a series of holes pierced through the upper plat to which is closely fitted a revolving disk with openings in an opposite direction. When air is forced by means of a bellows or some apparatus that furnishes pressure, the successive puffs of air produce tones. It is possible for the ear to distinguish the successive puffs when the disk revolves slowly, but a uniform note of a high pitch is obtained when the revolutions exceed ten per second. Large instruments of this kind are used as fog signals, but these are operated by steam.

SIRENIA (st-re'ni-a), an order of aquatic mammals, including the dugongs and the manatees. The body is formed somewhat fishlike and they live habitually in the water. These animals have no hind limbs and the fore limbs are present as flippers. They live on plants found in the sea and are most numerous in the deltas and mouths of rivers. Fossils occur in

large numbers in the Eocene Age. See Dugong; Manatee.

SIRENS (si'renz), in Greek legends, the sea nymphs that were seated on the island of the Sirens, off the southwest coast of Italy. Homer relates in his *Odyssey* that Circe warned

Odysseus not to listen to the song of the Sirens, for all who gave ear to their enticing strains felt an unconquerable desire to leap overboard and join them, when they either perished in the hands of the nymphs or



A SIREN.

were engulfed by the waves. Odysseus had his crew fill their ears with melted wax, but he so fondly loved adventure that he had his comrades lash him to the mast under promise that they were not to release him until they were out of sight of the island, no matter how much he might implore them to set him free. As the alluring strains fell upon his ears, he forgot all danger and entreated his companions to release him, which they refused to do until the enchanted island had been lost to view. When the danger was past, he gratefully acknowledged the firmness of his followers, which had been the means of saving his life. The Sirens are represented in art as having the form and wings of birds and the faces of youthful maidens. In some sculptures they have the form of maidens with claws instead of feet.

SIRIUS (sir'i-us), or Dog Star, the principal star in the constellation Canis Major, or the Greater Dog, and the brightest star in the sky. It is situated a little below Orion and, according to mythology, is one of the hounds following that heavenly constellation. In the 2d century Ptolemy classed Sirius among the red stars, but it is now a brilliant white, its light being 325 times as great as that of a star of the sixth magnitude. The mass is about twenty times as large as the sun. Astronomers estimate that Sirius is about a million times farther from us than the sun and express the view that it is constantly receding from the earth.

SIROCCO (si-rŏk'kô), or Scirocco, the name given in Italy to the hot, oppressive wind blowing across the Mediterranean from the desert of North Africa. It usually continues to blow from three to six days and, like the simoom, is inclined to bring on a feeling of exhaustion and suffocation. The greatest effect is felt in Malta and Sicily, but it also reaches the Ionian Islands and southern Greece.

SISAL (sĭ'säl), or Grass Hemp. See Hemp. SISYPHUS (sĭs'ĭ-fŭs), in Greek legends, a

noted king of Corinth, who was famed for promoting navigation and commerce. Writers credit him with founding the city of Corinth (Ephyra) and the establishment of the Isthmian games. In his later life he became cruel to travelers who visited his dominions, and often slew them by hurling upon them enormous pieces of rock. He was punished for his crimes by being compelled to roll a huge block of stone up a steep hill, which, on reaching the summit, rolled back to the plains below, thus making his task

SITKA (sĭt'kà), a city of Alaska, on the west coast of Baranof Island, 1,135 miles northwest of Seattle and 160 miles southwest of Juneau. The harbor is deep and commodious and near it are a number of islands. Toward the inland rise snow-clad mountains, which have clusters of shrubs and trees on the lower slopes. The climate is cold, having an average temperature of 42° Fahr., while the rainfall is about ninety inches. Vegetables of various kinds are produced, but oats does not ripen in the short summer season. Among the principal buildings is a Greek church, an industrial school, a museum, a hospital, and a number of business storehouses. Salmon canning, mining, lumbering, and gardening are the chief industries of the surrounding country. A company of Russians established a trading post at Sitka in 1799, when it was called New Archangel, and after the purchase of Alaska, in 1867, it became the capital. In 1906 the seat of government was

transferred to Juneau. Population, 1916, 1,120.
SITTING BULL, distinguished Sioux Indian chief, born in Willow Creek, in 1837; slain on the Grand River, Dec. 15, 1890. His Indian name was Tatanka Yotanka, and he showed a peculiar hostility toward the whites from early manhood. He commanded a band of Indians in the massacre in Minnesota and at Spirit Lake, Iowa, in 1862, and soon afterward found refuge in the Yellowstone region of Wyoming. In 1868 he was defeated in the Battle of Mussel Shell, but remained constantly on the warpath, partially because the government failed to carry out the terms of several treaties. Continuous friction occurred between the settlers and the Indians, and in 1876 General Custer was sent against the hostile tribe, but he and his entire force perished. General Terry was sent in pursuit of Sitting Bull, but he escaped with his band into Canada. When the government, in 1880, promised pardon to the Indians, he surrendered to General Miles and returned to Dakota. In 1890 another extensive insurrection broke out, and in the battle that resulted he and several others were slain.

SIUT (se-oot'), or Assiut, a city of Upper Egypt, capital of a province of the same name, 250 miles south of Cairo. It is situated on the west bank of the Nile, on the Cape-to-Cairo Railway, and is surrounded by a fertile section. A large dam is maintained across the Nile as a means of utilizing the water for irrigation. I the vicinity are ruins of extensive buildings erected at an early date in the history of Egypt, including tombs adorned with paintings and sculptures of historical value. The city has electric lights, public baths, and several fine mosques and bazaars. Pottery, pipebowls, clothing, and utensils are manufactured. Population, 1916, 46,106.

SIVA (se'va), the third person of the divine trinity of the Hindus, representing the principal of destruction. He is not mentioned in the Vedic hymns, but is referred to in many writings of the later Brahmanic literature. The linga is his symbol, which represents the creation that is to follow destruction. In statuary he is represented with five heads and three eyes, signifying the five-faced and the threeeyed. The representation of the Ganges, the sacred stream of the Hindus, is upon his head, and he holds a trident in one hand. As a destroyer of the world he is represented as of black color and he carries as his weapons an ax, a bow, and a thunderbolt. See Vishnu.

SIX NATIONS. See Iroquois.

SIXTUS (siks'tus), the name of five popes of Rome who reigned within the period between 119 and 1590. Sixtus I. was pope in 119-127; Sixtus II., in 257-259; and Sixtus III., in 432-440. The others are treated in articles below. See Pope.

SIXTUS IV., Pope of Rome, born near Savona, Italy, July 21, 1414; died Aug. 13, 1484. The village of Celle was his birthplace. He took the Franciscan vow at Savona and early attained a reputation for eloquence and learning. He was made cardinal by Paul II., in 1467, and was elected Pope on Aug. 9, 1471. Writers have made conflicting statements as to his administration of the pontifical office, but all agree that he lavished the treasures accumulated at Rome by providing for his relatives and for the purpose of improving the city and the architecture of the church. Among the structures built by him are the Sistine chapel and the Sistine bridge across the Tiber. He gave encouragement to painters and sculptors and greatly enlarged the Vatican library. Sixtus was the first Pope to send missionaries to the Canary Islands. A general Italian war was caused by his alliance with the Venetians against the Duke of Ferrara, which ended in dissolving the Venetian alliance. He was the author of several treatises, among them "De Sanguine Christi."

SIXTUS V., Pope of Rome, born near Montalto, Italy, Dec. 15, 1521; died Aug. 27, 1590. After receiving a liberal education, he was made professor at Rimini and Siena, and afterward became inquisitor-general in Venice. In 1565 he accompanied the papal legate to Spain and in 1570 was made cardinal by Pius V. He was intrusted with editing the corrected edition of the works of Saint Ambrose, which

were published in 1585. He was not in favor with Gregory XIII. and lived in retirement, but on the death of the latter was made Pope, in 1585. His administration of the office was able and energetic. Through study and discretion he attained a high standing among the popes as a ruler and statesman. Besides restoring order in the church, he regulated the finances, suppressed lawlessness, and encouraged commercial enterprises. He fixed the number of cardinals at seventy, published a new edition of the Vulgate, which had been ordered by the Council of Trent, improved the Vatican library, and paved the way for vigorous opposition to the growing power of the Lutherans and the Huguenots. Sixtus accumulated vast treasures, which he left to his successors for the purpose of extending the influence of the church.

SKAGER RACK (skäg'er råk), or Skagerrak, a channel extending from the North Sea between Norway and Denmark, communicating with the Cattegat. The length is 140 miles; width, 75 miles; and the depth is sufficient for the largest vessels. Several good harbors are located on the coast of Norway and Sweden. The Skager Rack, the Cattegat and the Sound form an important connection between the Atlantic and the Baltic Sea.

SKAGWAY (skag'wa), a port of entry in Alaska, at the mouth of the Skagway River, 202 miles north of Sitka. It is situated on the Lynn Canal and the White Pass and Yukon Railway, and has steamboat connections with Scattle and other cities on the Pacific. The chief buildings include those of the government, the public library, and several hospitals and public schools. Breweries, lumber mills, bottling works, and trading are the principal industries. It has a large trade in merchandise and supplies with points inland, especially the Yukon mining district. The first settlement in its vicinity was established in 1897 and it was incorporated in 1900. Population, 1900, 3,117; in 1910, 872.

SKALD (skāld), or Scald, the name of a class of Norse poets, especially applied to those who were advanced in educational training. They wrote a class of literature in which the deeds and exploits of their warriors and ancestors received prominent mention. In later times the courts employed skalds to prepare writings of a dramatic character. Several hundred of these writers are mentioned in the Icelandic literature and by historians.

SKAT, the name of a game played with cards, considered the most intricate of the games in which cards are used. The 32 cards that enter into a game of euchre are used, but the picture cards are not double-ended. Only three active players take part, but one or two associates may join. This game was originated in Altenburg, Germany. It requires a manual or guide to aid the beginner.

SKATE (skāt), the name of several species of fishes of the ray family, having a peculiarly

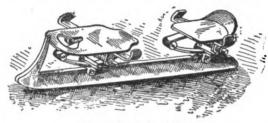
flat body. The snout of most species is pointed the tail is long and slender, and the upper part of the body is of a grayish or a mottled color. Among the American species are the barndoor and the tobacco-box skates. Those of Europe include the common and long-nosed skates. The long-nosed skate has a remarkably long and sharp snout and its body is between four and five feet in length. The common skate is very abundant in European waters and attains a large size. It usually weighs about 100 pounds, but sometimes specimens are obtained that weigh as much as 200 pounds or more. This species has a body whose breadth is greater than its length, the proportion being about four to three. This phenomenon, which is common to several species, is due to the expanding pectoral fins being concealed in a peculiar manner under the skin. See Ray.

SKATES, a class of devices that have a frame formed to fit the sole of a shoe, with a keellike runner of steel attached beneath. They are designed to move or glide over the ice. The earliest skates were made of the shinbones of animals, which were fastened to the feet by means of strings. It is thought that the first iron or steel skates were used in Holland, where they served to traverse the numerous canals, and in that country they are still worn by men and women when going to the city to engage in business for the day or to do shopping. Skates are employed extensively for a like purpose in Denmark, Sweden, and Norway, and in the two countries last mentioned the skee, or ski, is very common. The skee is a kind of toboggan for the foot, consisting of a long and narrow wooden runner, to which the shoe is attached, and is used for sliding over snow or ice. A skillful traveler is able to slide from ten to fifteen miles per hour on a skee, this depending somewhat on the character of the snow or ice, while the skate enables moving with rapidity only when the surface is quite smooth.

Many varieties of skates have been contrived, the construction differing somewhat with the purpose they are to serve. Formerly the frame designed to fit the sole of the shoe was made of wood and it was fastened by a heel screw and straps. At present metal is employed instead of wood, and greater security in fastening to the shoe is obtained by springs instead of straps. Skates for speed have a thin runner somewhat longer than the shoe, while the blade of those intended for figure skating is broader and rounded at the toe and heel.

Skating is an important branch of athletics, both in America and Europe. Many skating societies are maintained in the United States and Canada, the most important being the National Skating Association, which holds races annually. The best time made in America is one-half mile in 1.21 minutes, one mile in 2.50, three miles in 9.18, and five miles in 15.93. James L. Plimpton of New York invented the

roller skates in 1869, which are the only substitutes for ice skates that have ever proved successful. These consist of a frame to fit the sole of the shoe. They have two sets of parallel wheels, one each at the toe and heel, which set squarely on the surface whether the body



METALLIC SPRING SKATE.

of the skater is canted or upright. Roller skating is usually conducted on wooden or asphalt floors in rinks constructed for that purpose, but the fatigue is much greater than that accompanying skating on ice.

SKEAT (skēt), Walter William, philologist, born in London, England, Nov. 21, 1835; died Oct. 7, 1912. He studied at London, and in 1858 graduated from Cambridge University, where he became a fellow in 1860. In 1878 he was made professor of Anglo-Saxon at Cambridge, and in 1883 became a professor in Christ's College of that institution. His writings are very numerous and many of them have been widely translated. He translated Uhland's "Songs and Ballads" from the German, lectured extensively. and contributed to many magazines and periodicals. Among his principal works are "Etymological English Dictionary," "Principles of English Etymology," and "Concise Etymological Dictionary." He published extracts from several authors, including Chaucer's "Canterbury Tales," "Lay of Havelock the Dane," "Piers the Plowman," and "Kingis Quhair."

SKELETON (skěl'ě-tůn), the framework of animals, which in vertebrates is composed of bone and cartilage. It serves to support the fleshy parts and the nervous system, and forms levers for the muscles. In lower animals various structures take the place of the skeleton, as the shell of the clam, oyster, crawfish, and lobster. These formations are called exoskeletons, or dermoskeletons. The skeleton of vertebrates consists of the skull, the trunk, and the limbs, the whole constituting the interior skeleton, or endoskeleton. In man the skeleton is constructed after the same type as that found in some of the higher animal forms, but it is of an immeasurably higher development. The human skeleton is characterized by a relatively larger capacity in the skull for the brain development, longer arms, more convenience in the position of the foot, and more freedom of the lower limbs. These superior conditions give to man the ability to move with greater facility and aptness than any other living being.

The skeleton consists of about 200 bones, the number varying somewhat according to age. In the head are 22 bones, which are classed as eight skull bones and fourteen face bones. There are eight bones in the cervical region, 37 in the thorax, 64 in the upper limbs, five in the lumbar region, four in the pelvis, and 60 in the lower Several bones that are separated in youth become united later in life. Thus five of the false vertebrae at the base of the spine early join into the sacrum, while four tiny ones below it often grow into a bony mass called the coccyx. The sternum, composed of five pieces in childhood, consists of only three in the adult. While there is a change in the number of bones, their relative dimensions are adjusted with such exactness that the length of the entire skeleton can be obtained by measuring a single one of the principal bones. All the bones, removed from the body for the purpose of examination and study, form a natural skeleton, if connected by dried ligaments. An artificial skeleton is made by the bones being joined together by wire. See illustration on following page.

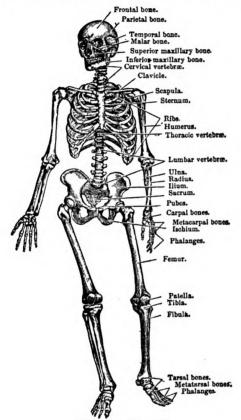
The names of the bones in the human skeleton are shown in the accompanying table:

NAMES OF THE BONES OF MAN. Frontal (forehead).
2 Temporal (temples).
2 Parietal (side).
Occipital (posterior base).
Sphenoid (base).
Ethmoid (base) of nose).
2 Superior Maxillæ (upper jaw).
2 Nasal (bridge of nose).
2 Malar (check).
2 Lachrymal (corner of orbit).
2 Turbinated (within nostrils).
2 Palate (posterior hard palate).
Vomer (nasal partition).
Inferior Maxilla (lower jaw).
7 Cervical Vertebræ (neck). Frontal (forehead) Skull HEAD 7 Cervical Vertebræ (neck).
Hyoid Bone (base of tongue).
14 True, 6 False, 4 Floating Ribs.
12 Dorsal Vertebræ (back). CERVICAL REGION Sternum. Clavicle (collar). Scapula (shoulder blade). Shoulder Humerus (arm). Radius, Ulna (fore UPPER EXTREMITIES. Kadius, Ulna (fore arm).
(8 Carpal (wrist).
Hand.... 5 Metacarpal (hand).
14 Phalanges (fingers).
5 Lumbar Vertebræ (loins).
2 Innominata.
Sacrum. LUMBAR REGION PELVIS..... Sacrum. Thigh Femur. (Patella (knee pan).
Tibia (large bone).
Fibula (outer bone).
Tarsal (instep, heel).
Material (arch).
Healinges (toes). LOWER EXTREMITIES ..

See Bones; Foot; Hand; Head, etc. SKELTON (skěl'tůn), John, poet, born in Norfolk, England, about 1460; died June 21, 1529. He graduated at Cambridge in 1482 and later studied at the University of Oxford. In 1498 he was ordained as deacon and soon after became tutor to Prince Henry, afterward Henry VII., who held him in high esteem. For some time he served in the position of jester and poet laureate at court, but in 1504 he was elected

to the office of royal orator. His writings were praised by Erasmus and esteemed by the wits of his time. He published "The Garlande of Laurell," "The Tunnynge" (the brewing), and "Why Come Ye not to Courte?" (a satire on Wolsey)

SKEPTICISM (skep'ti-siz'm), the system of philosophy which denies or doubts the existence of knowable truths or realities. As a doctrine it teaches that no fact or principle can be known definitely, that all knowledge is uncertain. It embraces Pyrrhonism in that it assumes the position that no fact or truth, no matter how worthy of confidence, can be established on philosophical grounds. In this sense it is op-



HUMAN SKELETON.

posed to the positive assumption, or assertion, of definite principles. The term skepticism is applied in theology to a doubt of the truth of revelation, the denial of the being or existence of God, and the doubt or denial of the divine origin of the Christian religion. Those who embrace the tenets of skepticism are known as skeptics. Pyrrho, one of the early skeptics, advised his students to suspend judgment in view of the contradictory nature of phenomena, and held to the theory that absolute knowledge is impossible. His pupil, Timon, elaborated upon

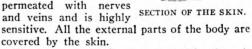
the elements of doubt by proceeding upon the premise that any proposition may be proven or contradicted by equally good reasons. David Hume's "Treatise of Human Nature" is a modern work on the subject of skepticism. This writer went so far as to question the validity of every act of conscience and is a representative of the modern school of skepticism. Kant, Spencer, and other writers, although sometimes classed as skeptics, more properly are agnostics.

SKI (skē). See Skates.

SKIMMER, the common name of a genus of web-footed birds of the gull family. lower mandible is compressed like the blade of a knife and is somewhat longer than the upper. These birds are sometimes called scissorsbills, for the reason that their bills are well adapted for cutting or scooping. The black skimmer is a common bird of the Atlantic coast of North America. It is about 20 inches long and the alar extent is 45 inches. The color is dark brown on the top of the head and upper surface, with markings of white underneath. It breeds on marshes and sandy islands, laying large, white eggs with ash-colored spots. Several other species, native to Europe and Africa, are known as cutwater, shearbill, or razorbill. These birds glide over the surface of the water and plow up small fishes with the immersed lower mandible. They are nocturnal in their habits, resting by day on the sandbars near the water. The female lays three or four eggs, which are hunted for food.

SKIN, the integument or outer covering of an animal, serving to protect the flesh and to

fill important functions as an active organ. In vertebrates the skin consists of two layers, the external one called the epidermis, cuticle, or scarfskin, and the inner one called the corium, cutis, or derma. These two layers are separated by a basement membrane, as shown in the illustration. The epidermis has no blood vessels and is not sensitive, while the derma, or true skin, is permeated with nerves



renewed regularly from the cutis below.

cuticle thickens and becomes horny by constant

use, thus supplying special protection to the

The true skin is always protected by the epidermis, but is the thickest on the back, in the palm of the hand, and at the sole of the foot. Flat cells or scales compose the cuticle and these are shed constantly from the surface in the form of dandruff, or scurf, but they are



parts serving important purposes, as the hand of the blacksmith or mason in handling tools. The outer surface appears smooth to the naked eye, but when examined through a microscope the little scales may be seen plainly. Besides these, the skin has small elevations, called papillae, that serve important functions, some as organs concerned in the sense of touch and others as a basis for the growth of hair. Hair and nails are modified forms of the cuticle and have equally important functions. When the cuticle is not restored, a scar results.

The cutis contains the sebaccous, fat, or oil glands, with ducts that pour their secretions into the hair follicle, a minute depression of the epidermis and cutis. Each hair of the scalp is generally provided with two glands, situated above the hair follicle, and their function is to oil the hairs and keep the skin supple. People . dwelling in hot countries are supplied with a greater abundance of oil glands to prevent the skin from drying. Besides, the skin has sweat glands, made up of tubes twisted in the form of a knot, leading to the surface by a long, sometimes spiral, duct. These ducts terminate in openings in the surface of the skin, called bores. Their function is to eliminate water from the system, to cool the body, and to expel certain waste materials that collect in the blood. It is estimated that there are about 2,225,000 pores in the human skin, and that generally about

two and a half pounds of watery vapor are eliminated per day. However, this is greatly influenced by the clothing worn, the temperature of the air, the amount and kind of food taken, and the exercise indulged in.

The skin serves as a respiratory organ, in that there is a small interchange of oxygen and carbonic acid gas. As an absorbing surface, it can take in water to a very limited extent. It has been found that death results when the pores of the skin are covered with varnish, and that it is highly essential to health for the skin to

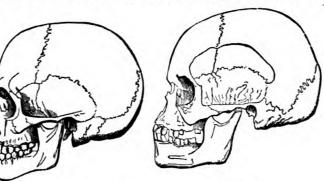
be kept clean by often washing it with soap and water. Baths not only remove accumulations of sensible perspiration on the skin, but tend to keep open the pores and facilitate the removal of dry scales as soon as they become

SKINK, a species of small lizards. The body is six to eight inches long and is covered with fishlike scales. It has a reddish-yellow color, but is marked by darker transverse bands. These animals have four strong limbs, but move somewhat like a serpent, and are able to enter small openings. They are quite numerous in the deserts of Africa and Asia, especially in the region of the Mediterranean. Several species are found in North America, ranging from Mexico to Alberta, but they are small, swift lizards and not true skinks.

SKIRRET (skir'ret), a perennial plant of China and Japan. It is cultivated for its edible root, which resembles that of a parsnip, but is clustered and somewhat aromatic. The plant grows to a height of six inches. Spirituous liquor is made from the root in some countries, owing to its having a large amount of sugar. Though cultivated in Europe, the plant is not grown extensively in America.

SKUA (skū'a), or Jaeger Gull, a web-footed bird of the Gull family, widely distributed along the coasts of the northern seas. It is distinguished by having a strong bill, long wings, a wedge-shaped tail, and a full and stout body. In disposition these birds are quarrelsome. They frequently pursue terns and gulls to compel them to drop fish and other articles of food. All the species pursue and feed upon living birds in the habit of the hawk. The Arctic skua is about twenty inches long and has a wing expanse of four feet. It is frequently seen in winter as far south as the Gulf of Mexico.

SKULL, the framework of the head of a vertebrate animal. It consists of the cranium and face. The human skull has 22 bones, of which eight are in the cranium and fourteen are in the face, but besides these are the bones of the ear and the teeth. A marked difference is noticeable between the skull of man and that



SKULL OF EUROPEAN.

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SKULL OF NEGRO.

of lower animals, in that the human skull has larger brain capacity and relatively a smaller face and jaws. The oval form is the best to resist pressure equally applied on all sides, and ample protection to the delicate brain is provided by the bones being composed, in general, of two compact plates, with a spongy layer between them. The frontal, occipital, and two parietal bones form the vault of the skull and are united by notched edges called sutures. These joints are not entirely closed in infants, but on the top is an opening termed the anterior fontanelle, so named from the perceptible pulsations of the brain, and it does not disappear entirely until the second year after birth, though sometimes the opening remains still

longer. The skull grows rapidly during the first seven years of life and upon attaining full development the interior capacity is about 85 cubic inches, though often 92 cubic inches. Intelligence is estimated largely from the structure of the skull, the highest development being found in the Caucasian and the lowest in the mongrel races of Malaysia. In some races there is an approach to the lower animals, since the jaw projects forward to a remarkable degree and the forehead recedes. See Face; Head; Facial Angle, etc.

SKUNK, a genus of quadrupeds of the weasel family, which are native to North America. They are about the size of a large cat. The common skunk has a long tail and very



SKUNK.

short legs. The general color is black, with white patches on the head and body. It is about twenty inches long and its tail is thirteen inches. The skunk resembles the polecat in having a potent and disagreeable odor that can be perceived at a long distance, which it emits from anal glands. These glands secrete a fluid that is thrown with considerable force when the animal is acting in self-defense or is scared, and its disagreeable scent can be removed only with much perseverance. Several species have been enumerated. They differ somewhat in size, but their habits are quite similar. They feed on eggs, birds, insects, reptiles, fruits, and small animals, which they hunt at night. The winter is passed largely in a dormant state. The flesh of the skunk is considered a wholesome food by the Indians and others, being tender and nutritious. Skunk grease is of value in dressing leather and the skins are important for their fur.

SKYE (skī), an island of the Hebrides, lying off the western coast of Scotland, next to Lewis the largest of the group. It has an area of 535 square miles. The shores are indented by numerous gulfs and bays, most of them having precipitous shores. A large part of the surface is mountainous. The Cuchullin, or Coolin, Hills are the highest elevations, their culminating peaks rising about 3,200 feet above sea level. It has valuable fisheries and productive crystalline limestone quarries. The chief soil products include oats, potatoes, and vegetables. Cattle and sheep rearing is the most im-

portant industry of the interior highlands, where pasturage of considerable value abounds, but the soil is not of material value for the production of cereals. Most of the land is owned by proprietors and attended by tenants, who use quite primitive methods in farming. The inhabitants are chiefly Celtic and speak the Gaelic language. Many Danish antiquities abound on the island. Portree, the principal seaport, has an excellent harbor and a considerable trade in merchandise. Population, 1916, 16,045.

SKYE TERRIER. See Terrier.

SLAG, a fused compound obtained in the reduction of metallic ores, consisting of silica in combination with bases, such as lime or alumina. All classes of slags contain some metallic ores, owing to the fact that conditions necessary to extract all the metal cannot be obtained. Anciently the proportion of metal wasted was quite large, and in recent times many of the old slags have been smelted profitably. Ideal conditions require that the fluidity be such that the metal may sink steadily through the slags, that undesirable bodies be not separated from themselves, and that they fuse at the right temperature. Slags are various in color, owing to the presence of different metallic oxides. Copper gives them a red or reddish brown, manganese a dark brown, and iron oxides a dark green or black color. In many of the older countries, slag is used for road building and other purposes.

SLANDER. See Libel.

SLATE, a kind of rock resembling shale, but differing from it in splitting readily into thin plates or sheets. It includes species having a variety of colors, among them bluish or grayish black, reddish brown, and greenish blue. Most species may be cut or scratched with a knife. Slate occurs in all countries having metamorphic rocks, and the quarried products are used for many purposes in manufacture and construction. The deposits differ in thickness and sometimes several grades of slate are found in different parts of the same quarries. Their uses depend upon the particular composition and the size of the sheets that may be obtained. Fine-grained species, yielding large, thick slabs, are used to make billiard tables, burial vaults, electrical switchboards, and sinks. The more fissile grades, which split into thin slabs, are employed for roofing and school blackboards. Slate is utilized in making whetstones and polishing and a soft variety is used for slate pencils. The most extensive deposits occur in Pennsylvania, Vermont, New York, and Quebec, where slate quarrying is an important and growing industry. Products from these quarries are transported to South America, Australia, China, and many countries of Europe, the principal exports being for roofing and interior decorative use. Extensive deposits of slate occur also in other sections of North America, and in Wales, France, and Scotland.

SLATER

SLATER, Samuel, capitalist, born at Belper, England, June 9, 1768; died April 21, 1835. He entered the factory of Jedidiah Strutt, a cotton spinner, at the age of fourteen. In 1789 he came to New York City and soon after started in the enterprise of cotton spinning at Pawtucket, R. I. This was the beginning of the cotton textile industry in the United States. In 1812 he erected extensive cotton mills in Massachusetts and elsewhere and later engaged in the manufacture of woolen textiles. John Fox Slater (1815-1884), his nephew, made a gift of \$1,000,000 to aid in the education of the Negroes. This gift was placed in the hands of a board of trustees and is known as the Slater Fund. The income is devoted to the construction of buildings and the teaching of worthy students, especially in manual training and industrial

SLAUGHTERHOUSE CASES, a number of notable causes at law decided by the Supreme Court of the United States. These cases grew out of an attempt made by the Legislature of Louisiana to restrict the slaughtering of animals in New Orleans, as a means to protect the public health of the city. This legislation in Louisiana restricted the butchering business to such an extent that it was practically prohibited by the general public, hence the cases were carried to the Federal courts and a final decision was reached in 1872. The decision is to the effect that the Fourteenth Amendment to the Constitution of the United States does not deprive the states of their right to establish police regulation, that this remains unimpaired with the states, and that it belongs to the states to provide security and protection for their citizens. The decision is looked upon as recognizing the greater rights of states and as a reactionary movement in the tendency of the Federal government to usurp the powers belonging to the states.

SLAVERY (slav'er-y), the institution under which human beings are held as the property or chattels of others. It implies the complete subjection of a person to the will and command of a master. The institution is as old as human history and still exists in some countries under modified forms. In the barbarity of remote antiquity victory in war was not complete until the adversary was put to death, but later the death penalty was inflicted only upon prominent leaders, while the rank and file were carried as captives of war into foreign lands and subjected to servile slavery. All the nations of antiquity practiced slavery in some form and utilized slave labor in the construction of highways, canals, aqueducts, pyramids, harbors, and military walls. They employed slaves in the productive arts, such as agriculture, commerce, and architecture. The Jews treated their slaves with considerable kindness and those of native blood were released after seven years of servile service.

GREECE AND ROME. Slavery was a vast institution among the Greeks, who employed slaves in domestic service and in the industries. They used them in the police and military services. For centuries the Greeks made the distinction of excluding the slaves from attending the gymnasia and public assemblies, but permitted their entrance into the temples and as spectators at festivals. Several writers have collected evidences to the effect that slaves were treated with harshness at Sparta, but they were protected at Athens from cruelty and severe abuse. Slavery among the Romans was an extensive and systematized institution, consisting of two classes of slaves, the captives of war and the debtors who were unable to meet their obligations. At first the Roman slaves had few rights to be respected, being entirely subject to their master, who was permitted on slight misconduct to take their lives without process of law. Later the institution so affected the industries that all the handicrafts, professions, and even literature were more largely under the direction of slaves than freemen. The rise of the empire witnessed a marked improvement in the condition of the slaves, who received legal standing in the time of Augustus, and their lives were placed under the protection of the state by Antoninus.

WESTLRN EUROPE. While the New Testament does not directly attack slavery, its teachings are quite inconsistent with the maintenance of such an institution. As Christianity spread over Europe, the harsher system of slavery was transformed into the milder serfage of th Middle Ages. The Koran, on the other hand, permits the acquisition of slaves by conquest, and this method was resorted to quite extensively in the time of the Crusades, but there were also importations of Negro slaves to Western Asia from the region south of the Mediterranean. Afterward Rome became a market for white slaves, who were sold into Mohammedan captivity, and subsequently a white slave piracy rose in the Barbary States, which attained a widespread influence in the 17th century. The Celts and other natives of Britain were enslaved by the Anglo-Saxon invaders, who carried on a considerable trade in Irish slaves with continental Europe. The system was discontinued with the Norman conquest in the 11th century, only to give place to serfdom under the feudal lords. Traces of serfs and serf labor remained in Scotland to the close of the 18th century and in other countries still later. See Serf.

SLAVE TRADE. The discovery of America gave a new and enlarged impetus to the slave trade. It was first sought to impress the Indian into service and make his race subject to the European conquerors of the new world, but it soon became apparent that the native American could not be successfully utilized in that way. As a result, Negroes were hunted in the interior of Africa and brought to the colonies. The first

slaves brought from Africa were landed at Santo Domingo by the Portuguese in 1503, and shortly after all the Christian colonial powers entered with more or less vigor in support of the slave trade. A Dutch ship landed the first cargo of slaves on the coast of Virginia in 1619, and the British government favored such importations into all of its American colonies. The traffic was very inhuman in many respects, the unfortunate Negroes in Africa being hunted with bloodhounds, crowded into unsuitable transports, and often treated with great cruelty upon reaching the American colonies. Sir John Hawkins was one of the most noted and persistent of the early British slave traders. It is estimated that about 925,000 slaves were brought to Jamaica alone prior to 1786.

William Penn and the Quakers have the credit of being the first Americans to strongly denounce the slave trade, but later societies sprang up in America and many European countries which advocated the suppression of the traffic and the gradual liberation of those in slavery. Though the Stuart kings of England and Queen Anne fostered the slave trade, sentiment became so pronounced against it that by the close of the 18th century its abolition became apparent. The French national convertion paved the way in 1794 by declaring the freedom of the slaves in the French colonies. The British Parliament passed the famous Abolition Act in 1807, which made the slave trade by British subjects illegal after Jan. 1, 1808, and in the same year the slave trade was prohibited by law in the United States. Soon after the traffic was abolished by all the civilized countries. This important movement was now followed by the proposition to liberate the slaves who were already under bondage.

Abolition of Slavery. Abolition societies were founded as early as 1780 in many Northern States of the United States, where the institution of slavery was never considered profitable, but the Southern States clung to their slaves with a growing interest. Washington and Jefferson were opponents of slavery until the invention of the cotton gin made it profitable in the Southern States, when they supported the institution, but Benjamin Franklin, John Jay, Alexander Hamilton, William Lloyd Garrison, and other eminent leaders were rapidly forming public sentiment in the North in favor of its abolition. Many of the abolitionists dreamed of a free northern republic, while the proslavery party of the South maintained views favorable to the organization of a southern republic in which slavery was to be legally recognized. Treaties between the radical elements resulted in the Missouri Compromise of 1820 and the Compromise of 1850, but the growth of new territory continually unsettled and changed conditions.

The election of Lincoln, in 1860, precipitated the secession of a number of Southern States,

thus hastening the Civil War, which extended from 1861 to 1865, and the Emancipation Proclamation issued on Jan. 1, 1863, liberated about 4,000,000 slaves. This was followed, in 1865, by the adoption of the Thirteenth Amendment to the Constitution, which received the approval of 27 of the 36 states, and thus slavery became prohibited in all territory belonging to the United States. Slavery was abolished by England in 1831, by Holland in 1863, by the Spanish in Cuba in 1886, and by Brazil in 1888. The number of slaves in America varied greatly. The slaves in the colonies were computed at 300,000 in 1776. In 1790 there were 697,897 in the United States; in 1850, 3,204,313; and in 1860, 3,953,760.

PRESENT ASPECT. A limited slave trade is still maintained on the eastern coast of Africa, mostly by Arabs, and the institution of slavery is recognized by law in some parts of Asia and interior Africa. The governments of Great Britain and Germany have been foremost in suppressing the slave traffic of Africa. These governments have promoted several treaties as a means to discontinue the system as an institution. With the extension of European authority in various parts of Africa, the development of the Congo Free State, and the application of modern industrial methods, the slave system is destined to ultimately become entirely superseded by free and competitive labor. It undoubtedly will be more difficult to overcome the practice in Western Asia than in Africa, since the Mohammedan faith is friendly to the use of slaves and the Moslem countries are practically impregnable to other religions and western industrial systems.

SLAVS (slävz), Slaves, or Slavonians, a branch of the Aryan family, which at present occupies large sections of Europe and the western part of Asia. The Slavs show a closer alliance to the Lithuanian than to the Germanic branch of the Aryan nations. In the early history of Europe they occupied the country tributary to the Carpathian Mountains. Subsequently they spread southward to the Adriatic and northward to the Baltic and overran large parts of Northern Asia. Their settlements on the Lower Danube date from the 6th century, when they passed into Thrace, Bohemia, Hungary, Styria, and other parts of Austria. In the 7th century they formed settlements in Bosnia and Servia, and ultimately spread northward over the region of modern Russia. A portion of their settlements in the south subsequently became a part of Greece and Turkey, while Hungary and parts of Transylvania were occupied by the Magyars and Rumanians, and large parts of Austria were taken by peoples of Germanic origin.

The two groups of Slavs include the western and the southeastern. The Poles, Czechs, and the Slovaks are comprised in the western group, and the Russians, Bulgarians, Slavonians, Servians, and Croats, in the southeastern. Ancient

writers generally agree in representing the Slavs as an industrious and brave people. They are credited with engaging largely in agricultural pursuits and supporting military movements rather for defensive than aggressive purposes. Their language shows a close alliance to the Sanskrit, but it is mixed considerably with the spoken tongues of other European peoples. Eight distinct dialects are recognized. They embrace the Russian, Bulgarian, Servian, Bohemian, Polish, Slovak, Polabic, and Wendic. The total Slav population of Europe is estimated at 170,-000,000, but there are considerable numbers in other lands. The Greek Orthodox faith is supported generally by the Slavs, but many Poles, Slovaks, and Czechs are Roman Catholics.

SLED, or Sledge, a vehicle for conveying loads over ice or snow. It has runners constructed of cast iron, or of wood with a steel sole, and both runners are slightly turned up at one end. Primitive sleds are made wholly of wood and have two long runners, but those of modern manufacture employ iron or steel largely, and usually consist of two sets of runners, popu-



SLED DRAWN BY DOGS IN THE ARCTIC REGIONS.

larly called bobsleds. A sleigh is a carriage on runners, usually two, and is used for conveying passengers. These vehicles are finely constructed with one or two upholstered seats and are drawn by one or more horses. Sleighing is a favorite pastime in countries where the climate is sufficiently cold to prevent the snow from melting for several months in winter.

SLEEP, a state of repose in which the activity of the senses and brain appears to be temporarily suspended. This state occurs periodically in man and animals and is characterized by partial or complete unconsciousness, relaxed condition of the body, and general diminution of vital functions. It is necessary that all parts of the body actively engaged in the discharge of important functions have a period of cessation from toil, and during the period of sleep the work of building up goes on to repair the loss occasioned by activity during the time of wakefulness. More sleep is needed in youth than in old age, when nature makes few permanent repairs and is content with temporary expedients. The number of hours required for sleep depends upon the character of employment and must be decided by each person according to apparent needs. From six to eight hours each day is the general average, but persons exercising their brain consecutively need more. It is of much importance that those who are tired should be allowed to sleep until awakened naturally, else the system does not obtain proper rest.

As compared to the state of being awake, the pulse and breathing are slower while sleeping, the secreting organs of the body are less active, and the pupil of the eye is contracted considerably. Another peculiarity is a lower temperature, especially from two to five o'clock in the morning, when the vitality is at the lowest point and mortality among the old and weak is greatest. It is generally assumed that dreamless sleep is the most restful and vitalizing, while a morbid tendency to sleep is the result of a degeneracy of the nervous tissue and a symptom of apoplexy. Sleep is prolonged in some animals, as in hibernation. The term sleep is applied in a varied sense to plant life, since the presence of light has a very marked effect upon the leaves, flowers, and other parts of vegetable growth.

SLEEPING SICKNESS, a disease which is peculiar to a region of Central Africa, extend-

ing from German East Africa to the Congo Free State. This disease has devastated many sections in the interior of the country. It spreads rapidly in the warm season, somewhat in the manner of yellow fever, and for a long time baffled the missionaries and physicians. It proved fatal along the lower Congo, on the Gold Coast, and even as far north as the Senegal. Dr. Robert Koch (q. v.)

in 1907 discovered that it is due to the tsetse fly, which carries the infection in the same manner as malaria and yellow fever are spread by the mosquito.

The disease first manifests itself by a mild remitting fever, accompanied by swollen lymphatic glands and an accelerated pulse, being due to the presence of a small number of parasites which infest the blood. In the second stage the fever becomes higher, the patient suffers with intense headache and apathy, and finally passes into a comatose condition. Dr. Koch discovered atoxyl, a derivative from arsenic, to be a true specific in causing the parasites to disappear from the blood. It was shown in 1907 that the fatality from the sleeping sickness is very extensive, several villages having been reduced in three years from 30,000 to 12,000 inhabitants. However, active operations to counteract the disease were instituted in 1908, when the English, German, and French governments formed a mutual working agreement. The plan is to segregate the infected in lazarets, remove villages from low and marshy places to higher lands, and establish extensive systems for drainage. These and other means are operating to limit the scope of the disease in the sections.

where permanent settlements have been established by the European.

SLEIGH. Set Sled.

SLIDELL' (slī-děl'), John, public man, born in New York City in 1793; died in London, England, July 29, 1871. After graduating from Columbia College and studying law, he entered upon a successful practice of his profession at New Orleans, in 1819, and in 1842 was elected to Congress as a Democrat. President Polk appointed him minister to Mexico in 1845, but he was not formally received by the Mexican government, and returned to the United States in 1847. He served in the United States Senate from 1853 until 1861, supported the secession of Louisiana in the latter year, and became Confederate minister to France. Captain Wilkes seized him and James M. Mason on the high seas while en route to France and the two were confined in Fort Warren, Boston harbor, until they were released at the demand of the English government, on Jan. 1, 1862. They immediately embarked for France, but, failing to induce the French government to recognize the independence of the Confederate States, they negotiated a loan of \$15,000,000 and secured the use of the ship Stonewall. Slidell settled in England shortly after the war, making his home in London.

SLIDE RULE, an instrument used to solve arithmetical problems. It consists of two parts, one of which slides upon the other, and on the surface of the parts are arithmetical linear scales. These are so related that it is possible to add and subtract by referring to the points as they coincide as the slide is moved. Multiplication and subtraction may be performed by means of logarithms, and natural sines, tangents, and the square or cube root of a number may thus be indicated.

SLIME MOLD, an organism usually classed as being of doubtful affinity, since it is difficult to determine whether it belongs to the animal or vegetable kingdom. Formerly the slime molds were classed as plants, but they show a close relationship to rhizopods, a class of protozoa. They consist of a mass of protoplasm during the growing stage, but are not definite in size and shape, and multiply by the development of spores. The spores burst and the protoplasm escapes in forms resembling those of an amoeba, each particle developing a delicate hair, or cilium. In this form the young life floats freely in the water, but later unites with other plants, sometimes a large number coalescing. Botanists recognize about 400 species, ranging from minute forms to some that are several inches in height.

SLING, a contrivance to throw missiles, such as stones or bullets. It consists of a small disk of leather pierced by a hole at each end for the attachment of strings about three feet long, and in the center is a small circular opening so as to permit the missile to lie quite firmly. When the stone or other object to be thrown is placed in the sling, it is held in one hand by the strings,

and after whirling it in a circle one string is freed to permit the missile to fly out in the direction aimed. This simple contrivance was important as a weapon among the ancients, both in hunting and for military purposes. It is recounted that the Achaeans and Persians were skillful slingers. Goliath, the celebrated giant of Gath, was felled by David by means of a sling.

SLOANE (slon), William Milligan, educator and author, born in Richmond, Ohio, Nov. 12, 1850. His father, James R. Sloane (1823-1886), was a pastor of the Presbyterian Church and a noted abolitionist, and in 1855 removed to New York City. The son studied at Mount Washington Collegiate Institute and Columbia College, graduating from the latter in 1868. Subsequently he taught in the Pittsburg Newell Institute for four years and in 1872 went to Berlin, Germany, to take an advanced course in philology. He was made professor of Latin at Princeton in 1877, secured the chair of history in 1883, and became professor of history in Columbia University, New York City, in 1896. His writings are numerous, including "Arabic Poetry Before the Time of Mahomet," "Life of Napoleon Bonaparte," "The French War and the Revolution," and "Life and Work of J. R. Sloane." He assisted George Bancroft in preparing the tenth volume of the "History of the United States," edited the "Life of McCosh," and was editor of the New Princeton Review and the American Historical Review.

SLOCUM (slokum), Henry Warner, soldier, born in Delphi, N. Y., Sept. 24, 1827; died in Brooklyn, April 14, 1894. He graduated from the West Point Military Academy, in 1852, and was assigned for service in the artillery. After attaining the rank of lieutenant, in 1856, he resigned his command in the army. Subsequently he studied and practiced law at Syracuse and was elected to the New York Legislature in 1860, but entered the army as colonel of the 27th New York volunteers at the beginning of the Civil War. He was severely wounded at the First Battle of Bull Run, where he rendered valued service and was promoted to be brigadier general soon after.

After rendering efficient service in the Peninsular Campaign, he was made major general of volunteers, and as such commanded in the Second Battle of Bull Run, at South Mountain, and at Antietam. In the spring of 1863 he participated in the battles of Chancellorsville, Fredericksburg, and Gettysburg, and in 1864 was conspicuous as a leader in the Southwest. He commanded the left wing of Sherman's army while marching to the sea and through the Carolinas, and participated at the surrender of General Johnston. In 1868 he entered Congress as a Democrat from the State of New York. He was reëlected in 1870 and 1884, serving on the floor of the House as an efficient and influential representative. He was president of the board of civic works from 1876 to 1878. Slocum served

SLOE

as one of the commissioners of the Brooklyn bridge.

SLOE (slo), or Blackthorn, a shrub of the plum family, usually growing to a height of from six to twelve feet. The wood is hard and



Flower and Fruit.

tough and the young growth is used for walking sticks. The flowers are white, preceding the leaves in the spring, and it is regarded by many as the original of the common garden plum. A species known as the common sloe is abundant in Europe, whence it has been brought to the New England states. The fruit is about the size of a large pea. It has a bitter taste and is sometimes used in making a wine and for preserves. The leaves have a greenish appearance, resembling tea, and are used to some extent in adulterating that commodity. The wood is hard and dark colored, takes a fine polish, and is used in making flails, handles to tools, and teeth to rakes.

SLOTH (sloth), a genus of mammals which belong to the bear family. They are native to Central and South America. These animals are peculiar for their long claws, which turn toward the body, thus making it difficult to move on the ground, but they pass to and fro with remarkable facility on the limbs of trees. They live almost entirely among the upper limbs of the larger trees in the tropical regions, where they are enabled to pass quite easily from one tree to another, which they do by clinging to the branches with their claws while the body is suspended beneath. The lips are long and extensile, thus enabling them to secure the insects, honey, fruits, and tender shoots of trees on which they feed. They are covered with coarse, shaggy hair, quite like withered grass, which protects them from insects and shields them from observation when at rest in the daytime. The tail is very short. The female produces one young at a birth, which clings to its mother until it is able to provide for itself. Flesh-eating animals and snakes are its enemies, but it protects itself against the former by climbing on the branches of trees and against the latter by using its powerful claws. Several species have been described by naturalists, the best known being the ai, or three-toed sloth, and the unau, or two-toed sloth. Both

these species have a plaintive cry.

SLOT MACHINE, a mechanical device designed to facilitate the sale of some commodities, usually small articles of confection. Machines of this kind are not of modern origin, but their use prior to 1880 was quite limited. At present many kinds of slot machines are in use, including those designed to facilitate the sale of chewing gum, cigars, and perfume. Some are designed to provide entertainment, such as phonographic machines and weighing machines. The last named have thus far proven most profitable, the reason being that there is no outlay for wares sold and the machine is a durable structure. Next to them in the way of profit are the gumselling machines, the outlay in these being small and the profit comparatively large.

These machines are so called from a slot into which a penny, nickel, or some other small coin is dropped by the patron, without which the machine cannot be operated. Most of the slot machines are stationed in hotels, railroad stations, and other public places, where they are patronized by the public, all the accounts being kept by an automatic mechanism in the machines. In some cases the slot machine has given rise to a form of gambling, in which kind the patron deposits a small coin, as a five or ten cent piece, expecting to receive in return a larger amount of money. The use of these machines is forbidden

in some cities by ordinance.

SLOVAKS (slo-vaks'), the name of a Slavic people of Europe, occupying a part of Moravia and Hungary. In language and traditions they are closely related to the Czechs, but a large number of them use the German language. In the 9th century they were a powerful part of the empire of Moravia, but later were subjugated by the Magyars. Many dialects are spoken by these people, but the writers, such as Holly and Kollar, preferred to use the German or the Bohemian tongues. In religion they are largely Roman Catholic. The number of Slovaks is estimated at about 2,000,000.

SLOVENIANS (slo-ve'ni-anz), a branch of the Slavic people in the southern part of Austria-Hungary. They reside chiefly in Carniola, Styria, and Carinthia. In habits and manners they are closely allied to the Servians. They number about 1,500,000.

SLOYD, the name of a system of manual training, called slojd by the Swedes, meaning skill or dexterity. It was originated in the past century, but its popularity dates from 1876, when Otto Solomon, president of the normal school at Naas, induced a greater interest in its higher and general development. Originally it trained in the manufacture of wooden household utensils, but now includes mechanical drawing and the use of complicated tools. The aim is to fit the student for practical lines in the industries, and especially to train for the employment of

knowledge gained in school as a means of aiding in the work to be done. The Sloyd system has been adopted in a more or less modified form in many countries of Europe and America.

SLUG, the common name of a genus of mollusks, differing from the snail in having only a rudimentary cell. The form is elongated and more or less concealed by a mantle. On the head are four tentacles or feelers that can be drawn back. These tentacles consist of two pairs, a short and a long, and on the tips of the longer pair are the eyes. The slugs become dormant in frosts, taking shelter under clods and vegetable forms. Slugs often frequent trees in search of decaying vegetable matter, on which they feed, and in some places they ravage the fields of growing crops during moist weather. A large number of species have been studied, the best known being the gray, great gray, red, and black slugs. They are distributed in many lands and most species are preyed on by mammals and birds.

SMALL ARMS. See Arms.

SMALLPOX, or Variola, a contagious disease, resulting from a specific morbid poison and passing through several stages. Contagion is the only known origin of smallpox. It is thought to be the most contagious of diseases. The period of incubation after exposure is believed to be from ten to fourteen days, but in cases of direct inoculation of the virus the time is much shorter. A high, inflammatory fever is the first manifestation of the disease. It is followed after three to five days by eruptions, which at first feel like small shot under the skin, but finally develop into serous infiltrations, called vesicles. The vesicles gradually increase in breadth, forming pustules, and by about the eighth day they break open. Shortly after they become covered by The number of pustules depends largely scabs. on the severity of the disease, ranging from only a few to many thousands. About the twentyfirst day the scabs are completely gone, leaving blotches of a reddish-brown color for several months, and in many cases they become permanent pits in consequence of ulceration of the true Vaccination is ordinarily a preventive, though not absolutely proof against it, but it has been found that persons vaccinated rarely have an aggravated form of the disease. About 50 per cent, of the persons afflicted with smallpox in former times died of the disease, but vaccination and enlarged skill in medical practice have lessened mortality to a remarkable extent.

SMEATON (smē'tun), John, civil engineer, born near Leeds, England, June 8, 1724; died Oct. 28, 1792. He was the son of an attorney and gave early evidence of interest in mechanical pursuits. In 1750 he removed to London, where he devoted himself to inventions, and the following year produced a machine for measuring a ship's path at sea and an improved form of the compass. He was made a member of the Royal Society in 1753 and two years later was

intrusted with rebuilding the Eddystone Lighthouse, which, on completion in 1759, secured him the Copley medal. The lighthouse constructed by him remained intact until 1882, a period of 123 years, when a new structure took its place. Other notable works supervised by him include the Spurn Lighthouse, the Forthand Clyde Canal, the Perth and Banff bridges in Scotland, and extensive improvements in the Ramsgate harbor. He published a report and description of the Eddystone Lighthouse.

SMELL. See Nose.

SMELT, a genus of fish of the salmon family, but differing from the salmon in having conical teeth on the jaws and tongue and on the tips of the vomer. Several species have been enumerated by writers. They are widely distributed, the American smelt being a common fish from New York to the northern coast of America. It has a greenish back and small scales and is about eight inches long. It is valued highly as a food fish. The smelt ascends the rivers in the spring to spawn and in the summer returns to the ocean, but in some cases becomes land-locked in the lakes. The smelts of Western Europe are somewhat smaller than the American species, but they are equally favored as food fishes. They abound in the North Sea and the Atlantic as far north as Norway. The flavor is best in the species frequenting the ocean at least part of each year.

SMET, Peter John de, missionary, born at Termonde, Belgium, Dec. 31, 1801; died May 23, 1872. He studied at the Seminary of Mecklin, a Roman Catholic institution, and in 1821 came to the United States. In 1828 he settled in Saint Louis, Mo., where he aided in founding the University of Saint Louis. He took up missionary work among the Pottawatomie Indians in 1838, and two years later established a mission among the Flatheads in the Rocky mountains. He translated a number of works into the native tongue, published several valuable reports, and interceded for the Indians in several disputes.

SMETANA (smě-tä'nà), Friedrich, composer, born in Leitomischl, Bohemia, in 1824; died in 1884. He studied under Liszt and other composers and founded a school of music in Prague. In 1856 he became conductor of concerts at Gothenburg, Sweden, and ten years later was made director of the national theater at Prague. He is the author of quartets and symphonies, but excessive work caused him to lose his mind. His chief productions are "The Bartered Bride," "Hakon Jarl," and "Wallenstein's Lager."

SMILAX (smī'lăks), a genus of plants belonging to the lily family. It includes about 200 species, of which the greater number are climbing and trailing plants. They are widely distributed in the temperate and tropical part of both hemispheres and include species that are useful in medicine and as food. About a dozen species are native to North America, including the greenbrier and carrion flower. Sarsaparilla

Siiribi

(q. v.) is obtained from the rootstock of the smilax. A plant cultivated and known as smilax

is a species of asparagus.

SMILES, Samuel, noted author, born at Haddington, Scotland, in 1812; died April 17, 1904. After completing a medical course in the University of Edinburgh, he established a practice in his native town, but later abandoned medicine to become editor of the Leeds Times. He became connected as secretary with the Leeds and Thirsk Railroad in 1845, and at intervals published a number of miscellaneous writings. His best known work is a treatise on self-culture, entitled "Self-Help," which appeared in 1859 and has been translated into about twenty different languages. Another work of wide repute is his "Life of George Stephenson," which resulted from forming the acquaintance of that noted engineer at Leeds in 1857. Smiles was granted a law degree by the University of Edinburgh in 1878. Among his works not mentioned above are "Life and Labor," "Brief Biographies," "Men of Invention and Industry," "Lives of Boulton and Watt," "Lives of Engineers," "Huguenots in France and England," and "A Publisher and His

SMITH, Adam, eminent writer on economical and moral science, born at Kirkcaldy, Scotland, June 5, 1723; died in Edinburgh, July 17, 1790. He descended from a respectable family, his father being Adam Smith, controller of the customs at the port of Kirkcaldy. After studying at Glasgow and Oxford, he was made professor in the University of Glasgow, where he held the chair of logic and later of moral science. In 1759 he published his "Theory of Moral Sentiments," a work most favorably received and widely read. He accompanied the Duke of Buccleugh on extensive travels in 1764 and, before returning to Scotland, spent nearly a year in Paris, where he met a number of eminent philosophers famous in the time of Louis XV. Shortly after he settled at Kirkcaldy, where he spent about ten years in preparing the material for his great work entitled "Inquiry Into the Nature and Causes of the Wealth of Nations," a production that marks an epoch in economical study and has been widely translated. It has been quoted as authoritative by many writers on economics. He was made lord rector of Glasgow University in 1787.

SMITH, Alexander, poet, born at Kilmarnock, Scotland, Dec. 31, 1830; died Jan. 5, 1867. He became a designer in a lace factory at Glasgow and while working began to take an interest in poetry. In 1853 he became well known by publishing "A Life Drama" and was soon after made president of the University of Edinburgh. Several of his books were published in conjunction with Sydney Doebell, with whom he was classed as a member of the Spasmodic School. His chief works include "Sonnets of the Crimean War," "A Summer in Skye," and "The City Poems."

SMITH, Andrew Heermance, physician, born in Charlton, N. Y., Aug. 27, 1837. He studied at the College of Physicians and Surgeons, New York City, and later at the universities of Berlin and Göttingen, Germany. In 1861 he became an assistant surgeon in the United States Army, serving throughout the Civil War, and after the close of the war established a successful medical practice in New York City. Several domestic and foreign societies bestowed honors upon him for rendering efficient services in the art of healing. He contributed to our knowledge of pneumonia and suggested the medical uses of oxygen. In 1890 he was a delegate to the International Medical Congress at Berlin.

SMITH, Andrew Jackson, soldier, born in Berks County, Pennsylvania, April 28, 1815; died Jan. 30, 1897. He graduated from the West Point Military Academy in 1838 and served in the Mexican War. At the beginning of the Civil War he was commissioned colonel of a cavalry regiment in California. Later he took part in the siege of Corinth, in the expedition of the Yazoo River, in the Vicksburg campaign, and in the Red River expedition. In 1864 he was commissioned major general and as such participated in the Battle of Nashville. Subsequent to the war he resided in Saint Louis, Mo., where he was appointed postmaster in 1869.

SMITH, Charles Emory, journalist and statesman, born in Mansfield, Conn., Feb. 18, 1842; died Jan. 19, 1908. He attended the Albany Academy and Union College in the State of New York, graduating from the latter in 1861. In the Civil War he served under General Rathbone and Governor Morgan in recruiting regiments, and after its close took up journalistic work in Albany, first as editor of the Express and later of the Albany Evening Journal. He was elected a regent of the University of the State of New York in 1878, and in 1880 became editor of The Press in Philadelphia, which he made an important factor in state and national politics. President Harrison appointed him minister to Russia in 1890, and while there he took an active part in relieving the sufferers in the widespread famine of 1891-92, but returned in the latter year to take an active part in the national campaign. President McKinley appointed him Postmaster General in 1898, to fill the vacancy caused by the resignation of James A. Gary. He continued a member of the Cabinet after the succession of Roosevelt to the Presidency, but retired in 1902.

SMITH, David Eugene, educator, born in Cortland, N. Y., Jan. 21, 1860. After attending the public schools, he studied at Syracuse University, and began the practice of law in 1881. In 1884 he became teacher of mathematics at the normal school in Cortland, serving until 1891, when he was chosen professor of mathematics in the Michigan State Normal College, and in 1898 became principal of the New York State Normal School. He was made professor of

mathematics in Columbia University in 1901, and became known as a lecturer in the Harvard University and for societies promoting summer courses. He published a number of text-books on elementary mathematics, edited the Bulletin of the American Mathematical Society, and contributed to the New International Encyclopaedia. He and W. W. Beman translated Fink's "History of Mathematics" and Klein's "Famous Problems of Geometry."

SMITH, Edmund Kirby, soldier, born in Saint Augustine, Fla., May 16, 1824; died March 28, 1893. After graduating at the West Point Military Academy, in 1845, he became a teacher and instructed as assistant professor of mathematics at West Point from 1849 to 1859 He was made a major in the United States army in January, 1861, but on the secession of Florida resigned his commission and joined the Confederate army. Efficient service caused his promotion to the rank of lieutenant general in 1862 and the following year to that of general. He took part in the First Battle of Bull Run in 1861 and afterward fought at Richmond, Perryville, and Murfreesboro. In 1863 he was given command of the trans-Mississippi department, where he organized a government and established factories for supplying the troops with munitions of war. The following year he opposed and defeated Banks in the Red River campaign. His army was the last to surrender. He served as president of the Atlantic and Pacific Telegraph Company from 1866 to 1868, was chancellor of the University of Nashville from 1870 to 1875, and subsequently became professor of mathematics in the University of the South, at Sewanee, Tenn., where his death occurred.

SMITH, Eli, missionary, born in Northford, Conn., Sept. 13, 1801; died in Beyrout, Syria, Jan. 11, 1857. He was educated at Yale University and Andover Theological School, graduating from the latter in 1826. The following year he sailed to Malta as missionary of the American Board and had charge of the printing office while superintending his charge. After traveling as a missionary in Syria, Greece, and Armenia, he settled at Beyrout, in 1833, where he made a study of several Eastern languages and assisted in explorations of Palestine. In 1839 he went to Leipsic, Germany, to have cast an improved font of Arabic type, a work that proved of vast importance in revising the printed form of Arabic. The last ten years of his life were spent with Cornelius Van Dyke in translating the Bible into the Arabic language. He published "Missionary Researches in Armenia." His wife, Sarah Lanman Smith (1802-1836), accompanied him and rendered valuable assistance in his missionary work.

SMITH, Francis Hopkinson, artist and author, born in Baltimore, Md., Oct. 23, 1838. He received a good education and studied engineering, and for some time had employment as an engineer in building public works. Some of

his construction work was done under contracts with the United States government. As an artist he produced a number of excellent paintings, among them "In the North Woods," "In the Darkling Woods," and "A January Thaw." His writings include "Well-Worn Roads," "Colonel Carter of Cartersville," "Book of the Tile Club," "Tom Grogan," and "Old Lines in New Black and White." He died April 7, 1915.

SMITH, George Adam, theologian, born in Calcutta, India, Oct. 19, 1856. He studied at the University of Edinburgh and at New College, and subsequently took courses at the universities of Leipsic and Tübingen. Shortly after receiving his degree, he traveled extensively in Egypt and Western Asia and served as instructor in Hebrew at the Free Church College of Aberdeen, from 1880 until 1882. In the latter year he was made pastor of the New Church at Edinburgh, serving until 1892, when he was chosen professor of Hebrew in the Free Church College of Glasgow. He visited America in 1903 and lectured extensively, including several lectures at the Union Theological Seminary. His "Historical Geography of the Holy Land" was published in 1901. Among his numerous writings are "Commentary on Isaiah," "Preaching of the Old Testament to the Age," "Life of Henry Drummond," "Commentary on the Twelve Prophets," and "Historical Atlas of the Holy Land."

SMITH, Gerrit, capitalist, born at Utica, N. Y., March 6, 1797; died Dec. 28, 1874. He studied at Hamilton College and settled at Petersboro, N. Y., as manager of his large landed estate inherited from his father, Peter Smith, who was associated in the fur trade with John Jacob Astor. In 1852 he was elected to Congress, but refused to accept a reelection. He supported the Free-Soil party, gave financial aid to John Brown, and was for several years Governor of New York. In 1867 he joined Horace Greeley in signing the bail bond of Jefferson Davis. He published "Speeches in Congress," "Sermons and Speeches," and "The Religion of Reason."

SMITH, Goldwin, educator and historian,

born in Reading, England, Aug. 13, 1823. He studied at Eton and Oxford, and in 1847 became a fellow of University College. As secretary of the Oxford University Commission he compiled the government Blue Book on education in 1858, and in the same year became professor of modern history at that uni-



GOLDWIN SMITH.

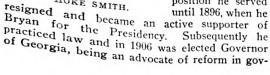
versity, holding the position until 1866. He was a prominent champion of the Union cause in

the American Civil War and visited the United States in 1864. On returning to England he published "England and America" and "Civil War in America," two works highly favorable to the North, and in 1868 resigned his chair at Oxford to become professor of English and history in Cornell College at Ithaca, N. Y. In 1871 he removed to Canada and at different times edited the Canadian Monthly, The Bystander, and The Week. His writings include "Lectures on the Study of History," "Irish History and Character," "Essays on Questions of the Day," "Oxford and Her Colleges," "Specimens of Greek Tragedy," "Guesses at the Riddle of Existence," and "Political History of England." He died June 7, 1910.

SMITH, Henry Boynton, clergyman, born in Portland, Me., Nov. 21, 1815; died in New York City, Feb. 7, 1877. He graduated from Bowdoin College in 1834, studied theology at Andover and Bangor theological seminaries, and later attended the German universities of Halle and Berlin. From 1842 to 1847 he officiated as clergyman in the Congregational Church at West Amesbury, Mass., and in the latter year became professor of mental and moral philosophy at Amherst College. He was chosen to the chair of church history of Union Theological Seminary in New York City, in 1850, and four years later became professor of systematic theology in the same institution, a position he held for twenty years. He founded the American Theological Review in 1859, the Presbyterian Review in 1862, and the Princeton Review in 1871. Among his writings are "Introduction to Christian Theology," "History of the Church of Christ in Chronological Tables," and "System of Christian Theology." He edited Hagenback's "History of Chiristian Doctrine," Gieseler's "Church History," and Stier's "Words of the Lord Jesus."

SMITH, Hoke, public man, born in Newton, N. C., Sept. 2, 1855. He studied at home under private tutors and in 1872 removed to Georgia,

where he taught school a number of years. Later he was admitted to the bar and practiced law in Atlanta. From 1887 to 1898 he was editor of the Atlanta Journal. President Cleveland made him Secretary of the Interior in 1893, in which HOKE SMITH. position he served



ernment and in the regulation of railroads. In 1907 he signed the prohibitory liquor law enacted by the Legislature.

SMITH, John, eminent explorer and founder of Virginia, born in Willoughby, England, in January, 1579; died in London, June 21, 1632. He

was the eldest son of a tenant farmer named George Smith. attended the free schools of Alford and Louth, and in 1595 ran away from home to spend ten years of adventure in Europe, Asia, and Africa. His first travels were in France and Holland, but he soon entered the military service



JOHN SMITH.

and was connected with a number of leaders. After fighting against the Turks in Hungary, he became connected with a piratical ship on the Mediterranean, but again entered the military service, taking a prominent part under the Duke of Austria against the Turks. The latter took him a prisoner and sold him into slavery, but he soon escaped and made an extensive tour through Germany and other European countries, and, after traveling in Morocco, returned to England in 1605. In the same year he joined an expedition to explore and colonize Virginia, the expedition consisting of three vessels, 140 colonists, and forty sailors. It reached the West Indies on March 24, 1607, and, after sailing northward, became lost in the sea, but was fortunately driven by a gale into the mouth of Chesapeake Bay. The mouth of the James River was reached on April 26, 1607, and, after exploring the stream, the company selected a site for their capital, which they named Jamestown.

Smith had been charged with wanting to establish a kingdom in Virginia with himself as sovereign while the expedition was still en route, but after trial was acquitted and became the most active and important member of the new colony. He made a number of important explorations. While in the Chickahominy region he was taken prisoner by Powhatan, but was saved from execution by Pocahontas, daughter of the famous Indian chief. On returning to Jamestown he found the colonists reduced to about forty members, all of whom were anxious to return to England, many of them being illy fitted to battle against the hardships of pioneer life. Smith succeeded in inducing them to await the arrival of other colonists from England, and in 1608 made extensive explorations of Chesapeake Bay and the country surrounding it, of which he prepared a map of value to later settlers. In the spring of 1609 he was severely wounded by the accidental discharge of a quantity of powder, and soon after was obliged to return to England for

SMITH

treatment, being succeeded as governor of the

colony by Lord Delaware.

Smith never visited Virginia again, but in 1610-17 he made extensive explorations in the regions now occupied by New England and Southeastern Canada, his primary object being to fish for cod and establish the fur trade, but in 1615 and 1617 he made two unsuccessful attempts to found settlements. The last thirteen years of his life were spent in writing accounts of his travels. He was buried in Saint Sepulchre's Church, London. Among his writings are "Observations of Captain John Smith," "General History of Virginia," "Description of New England," "Map of Virginia," "New England and the Summer Isles," "True Travels," and "A True Relation of such Occurrences and Accidents of Note as hath happened in Virginia."

SMITH, Joseph, the founder of the Mormon Church, born in Sharon, Vt., Dec. 23, 1805; died June 27, 1844. His parents removed to Palmyra, N. Y., where he was impressed by the disagreement among the religious denominations. In 1827 he announced that he had received a vision in regard to a sacred book that he claimed was buried near Manchester, and later he received a volume that is alleged to be the Book of Mormon. He gathered a few followers and removed to Kirtland, Ohio, in 1831, where he failed in the management of his community and a storehouse. Soon after he founded the city and temple of Zion near Independence, Mo., and succeeded in attracting a large following. In 1844 he was a candidate for President of the United States, was mayor of Nauvoo, Ill., and became complicated in legal controversies. The grand jury indicted him on charges of perjury and adultery. Feeling ran against him to such an extent that he was taken from the jail in Carthage and was shot. See Mormons.

SMITH, Samuel Francis, clergyman and author, born in Boston, Mass., Oct. 21, 1808; died there Nov. 16, 1895. After graduating from Harvard University and Andover Theological Seminary, he became a pastor of the Baptist Church, securing the charge in Waterville, Me., in 1832. He was professor of modern languages in that city from 1834 until 1842 and in the latter year removed to Newton, Mass., where he published the Christian Review. He visited the chief mission stations of Asia in 1875 and again in 1880, remaining abroad for several years. Smith is the author of a large number of wellknown hymns, many of them being used in Baptist and other hymn books. The best known is "My Country, 'Tis of Thee," the national anthem, which was written in 1832 while he was a student at Andover. A brilliant reception was given to him in Music Hall, Boston, on April 3, 1895, when the national anthem and other hymns from his pen were sung. "The Morning Light ls Breaking." a favorite missionary hymn, was written by him in 1832. His hymns were published under the titles, "Lyric Gems," "Rock of

Ages," and "The Psalmist."

SMITH, Sydney, author, born in Essex, England, June 3, 1771; died in London, Feb. 22, 1845. He studied at the Winchester School and Oxford University and soon after became clergyman of Amesbury, in Wiltshire. A member of his congregation selected him to accompany his son as tutor to the University of Weimar, Germany, but that country became the seat of a prolonged war and he proceeded to Edinburgh, where he served as clergyman in the Episcopal chapel. In 1802 he joined several others in establishing the Edinburgh Review, a periodical that marks an epoch in the literary and independent criticism of Scotland.

He removed to London in 1803, where he attained a wide acquaintance as a fine pulpit orator and lecturer on moral philosophy. Later he filled other charges, among them those at Foston-le-Clay, in Yorkshire, and Combe-Florey, in Somerset, and in 1831 was given a prebendary at Saint Paul's Church, London. His writings include chiefly religious and political works, through which run a vein of pleasantry and truth. A large number of his contributions to the Edinburgh Review were collected and republished in 1839. Other writings from his pen embrace "Peter Plymley's Letters," "Speeches on the Catholic Claims and Reform Bill," "Letters on Railways," "Letters on American Debts," "The Ballot," and "Letter to Lord John Russell on the Church Bills." "Peter Plymley's Letters" was written in favor of Catholic emancipation, while "Letters on American Debts" treats of the repudiation of debts by the State of Pennsyl-

vania. It appeared in 1843.

SMITH, William, geologist, born at Churchill, England, March 23, 1769; died Aug. 28, 1839. He studied to become a civil engineer and, while practicing that profession, took up the study of soils and rocks. During this time he made a number of maps showing the order of succession in the geological strata. His geological map of England and Wales required about fifteen years, which he afterward supplemented with separate maps of the counties. This work comprises the first map of the kind to be issued of England. He was granted a pension by the government in recognition of his service to science, and several medals were bestowed upon him. He is generally regarded as the "Father of English Geology."

SMITH, William Farrar, soldier, born at Saint Albans, Vt., Feb. 17, 1824; died in 1903. He graduated at the United States Military Academy in 1845, where he was made an instructor in mathematics. In 1861 he took part in the First Battle of Bull Run. He served in the defenses of Washington, in the Peninsula campaign, and in the battles of South Mountain and Antietam. In the meantime he was made major general of volunteers and as such commanded at Fredericksburg. In 1863 he became

chief engineer of the department of the Cumberland and later of the Mississippi, and in 1865 resigned as major of volunteers and was commissioned major general in the regular army. Subsequently he was police commissioner of New York City and by act of Congress was reappointed major in the army, but retired in 1889.

SMITH, William Robertson, theologian and Orientalist, born in Keig, Scotland, Nov. 8, 1846; died in Cambridge, March 31, 1894. His father was a Free Church minister, under whose care he received his early education, and afterward attended the University of Aberdeen. Subsequently he studied theology at Bonn and Göttingen, Germany, and in 1870 became professor of Hebrew in the Free Church College of Aberdeen, but was later suspended for rejecting the Mosaic authorship of the Book of Deuteronomy. During his suspension he traveled in Egypt and Arabia and was afterward dismissed. Subsequently he lectured on various subjects relating to theology and Bible history, and in 1881 became an associate editor of the Encyclopaedia Britannica, but on the death of T. Spencer Daynes, in 1887, was made editor in chief. Smith was an able writer and lecturer and a fearless investigator of complicated questions. Among his published works are "The Prophets of Israel and Their Place in History," "Old Testament in the Jewish Church," "Kinship and Marriage in Early Arabia," and "Religion of the Semites."

SMITH, Sir William Sidney, admiral and hero of Acre, born at Westminster, England, July 21, 1764; died in Paris, France, May 26, 1840. He was the second son of John Smith, captain of the guards, and at the age of eleven years entered the navy to participate in the American war. His courage displayed in an engagement off Cape Saint Vincent, in 1780, caused him to be made lieutenant on the Alcide, and in 1782 he became captain and was given command of the sloop Fury. From 1790 to 1792 he aided the King of Sweden against Russia, was sent on a mission to Constantinople the following year, and soon after joined Lord Hood in destroying the French ships and arsenal at Toulon. The French took him prisoner at Havre de Grace in 1796 and sent him to Paris, but he made his escape two years later and returned to England. He was soon after sent as minister to Constantinople. While there he learned that Napoleon designed an attack on Saint Jean d'Acre and hastened to its relief. After capturing a number of French vessels on March 16, 1799, he successfully defended the town and obliged Napoleon to raise the siege and retreat in disorder. This brilliant exploit won him the thanks of Parliament and a pension of £1,000. He was elected to Parliament in 1802 from Rochester, served with distinction in Sicily and Naples in 1805, and was promoted to the rank of admiral in 1821. The later years of his life were spent at the French capital.

SMITH COLLEGE, an educational insti-

tution at Northampton, Mass., founded in 1871 to promote the higher education of women. It is so named from Sophia Smith, who founded the institution and made a bequest to it of \$365,-000. Students who complete the undergraduate courses receive the degree of bachelor of arts, and more advanced study entitles them to the degree of master of arts. Among the chief buildings are the College Hall, the Lilly Hall of Science, the Music Hall, the Chemistry Hall, and the Hillyer Art Gallery. The grounds and buildings are valued at \$1,250,000. About 100 professors and instructors are employed and the institution is attended by 1,250 students.

SMITH'S FALLS, a city of Ontario, in the counties of Greenville, Lanark, and Leeds, 40 miles southwest of Ottawa. It is on the Rideau Canal and the Canadian Pacific Railway and is surrounded by a fertile farming country. Among the principal buildings are the high school, the Rideau Hotel, and several fine churches. The manufactures include brick, clothing, stoves, flour, woolen goods, and machinery. Power is obtained from the Rideau River. It has electric lighting and municipal waterworks. Population,

1901, 5,155; in 1911, 6,370.

SMITHFIELD, a six-acre tract of land in London, England, lying north of Newgate and west of Aldersgate. It was an open spot and was used for strolling in the early part of the 12th century, but in 1150 was converted into a stock and hay market, for which it was used until 1855. Smithfield served as the seat of the Bartholomew Fair and as the place of execution of English martyrs between the years 1401 and 1612. Charles Dickens mentions it in his "Oliver Twist." The greater part of it is occupied at present by gardens, seats, paths, and drinking fountains, but a small portion of it is still used

as a hay market. Several railways cross it. SMITHSON (smith'sun), James, scientist, born in France about 1765; died June 27, 1829. He was a son of Hugh Smithson, the first Duke of Northumberland, and was educated at Pembroke and Oxford. In 1787 he was made a fellow of the Capital Royal Society and devoted himself largely to the fields of chemistry and mineralogy. His life was spent chiefly in Paris, but he died in Genoa, Italy. His fortune of \$515,000 was left to his nephew, Henry James Hungerford, and it was stipulated in the will that, if the legatee should die without issue, the entire amount should be used to found an institution at Washington, D. C., whose purpose is to be for "the increase and diffusion of knowledge among men." Since Hungerford died childless, the bequest was transferred to the United States. See Smithsonian Institution.

SMITHSONIAN INSTITUTION (smith-so'ni-an), a scientific institution in Washington, D. C., established by act of Congress in 1846. This institution owes its origin to James Smithson, son of the third Duke of Northumberland, who, by the terms of his will, gave an estate worth \$515,169 to the United States government "to found at Washington, under the name of the Smithsonian Institution, an establishment for the increase and diffusion of knowledge among men."

Congress accepted the bequest in 1836 and it has been enlarged by subsequent additions to about \$950,000, which amount is held as a deposit in the United States treasury. This fund yields an income of about 6 per cent. The institution is governed by a board of regents composed of the Chief Justice of the United States, three representatives appointed by the speaker of the House, three senators appointed by the Vice President of the United States, and six citizens chosen by Congress. The general management is largely under the direction of the secretary. It has splendid buildings of Seneca brownstone, which are located in the south part of the Mall, a short distance east of Washington's monument.

The institution has the Bureau of Ethnology, the Bureau of Publications, the Astrophysical Observatory, the Bureau of Research, the National Museum, and the National Zoölogical Park. The last two mentioned are supported entirely by congressional appropriations. National Zoölogical Park occupies a tract of 170 acres in Rock Creek Valley, near Washington. Three series of publications are issued under the direction of the secretary, known as the Smithsonian Annual Reports, Smithsonian Contributions to Knowledge, and Smithsonian Miscellaneous Collections. The Smithsonian Library has 115,000 volumes, but pamphlets, periodicals, and maps bring the aggregate up to about 160,000 pieces. Most of this collection is at present accommodated in the congressional library build-The secretaries of this institution include Joseph Henry, S. F. Baird, S. P. Langley, and Charles D. Walcott.

SMOKE, the volatile vapor arising from the combustion of any organic matter, as wood or coal. The term is applied in a more limited sense to the visible vapor arising from a burning substance, but, besides this, invisible gaseous matter escapes. Burning wood gives off an almost invisible smoke, consisting of water and carbonic acid, but the smoke arising from burning coal is darkened by the presence of soot, oily vapor, and fine particles of carbon. It has long been a problem how to overcome the evils of dense smoke in large manufacturing centers, especially where great quantities of bituminous coal and crude oil are consumed. Experience has shown that if the black smoke, which escapes from a furnace when a quantity of cold coal is thrown in upon an incandescent mass, can be made to pass over another portion of coal in active combustion, this carbon is consumed; that is, it is combined with atmospheric oxygen and converted into carbonic oxide, which burns, producing carbonic acid, and therefore eventually escapes as colorless vapor.

Any process that tends to increase the flame

of burning material diminishes the volume of visible smoke. This is due to the fact that combustion becomes more perfect by providing a larger amount of oxygen, which can be done only by inducing an adequate draught of atmospheric air. A high degree of efficiency is secured in many American manufacturing centers using natural petroleum, where a jet of heated steam is blown into the hot combustion chamber and the oil and air enter and mix with it. Many experts argue in favor of first converting the coal into gas, as we secure a smokeless fuel in the gas, while the coke produced during the preparation of the gas has many uses, especially as a solid fuel. Pittsburg has made remarkable progress in overcoming the evils of smoke from factories by using large quantities of natural gas, which produces no visible smoke and leaves no cinders. While that city was formerly quite dirty, it is now one of the cleanest manufacturing centers in the world.

SMOKELESS POWDER, an explosive that acts without the production of much smoke, used chiefly for military purposes. About 50 per cent. of ordinary gunpowder is made up of finely divided solids, but smokeless powders develop wholly gaseous products in the course of combustion. Besides being partly or entirely smokeless, these powders are more valuable than black gunpowder because they impart to projectiles higher velocities. They are prepared by the dis-solution of gun cotton and nitrocellulose in ether, after which the compound is dried into a hornlike substance. The nitrocellulose used in this process of manufacture is prepared by soaking wood pulp or sawdust in a solution of nitric acid, or nitric and sulphuric acids. When fully hardened by drying, the product is prepared for use by separating into flakes or grains by machines. In some varieties cellulose nitrate is mixed with nitroglycerin, or with nitro derivatives of hydrocarbons, such as picric acid. The ingredients depend upon the maximum initial velocity desired. See Gunpowder.

SMOLENSK (små-lyĕnsk'), a city of Russia, capital of the government of Smolensk, on the Dnieper, 260 miles southwest of Moscow. It is surrounded by massive walls, but they are not maintained in a good condition for defense. The principal buildings include the Cathedral of Uspenski, the museum, the public library, the episcopal palace, and a number of educational and industrial institutions. It has railroad facilities and a large trade. The manufactures include soap, leather, linen textiles, carpets, and machinery. The place was a part of Poland until 1654, when it was annexed to Russia. It was the scene of a battle between the French and Russians in 1812. Population, 1916, 51,982.

SMOLLETT (smŏl'lĕt), Tobias George, historian and novelist, born in Dalquhurn, Scotland, in 1721; died near Leghorn, Italy, Oct. 21, 1771. He descended from a distinguished Scotch family, studied at the University of Glasgow,

and was afterward apprenticed to a surgeon in that city. It was his early intention to practice the profession of medicine, but his medical study gave way to interest in literature, and in 1740 he went to London to secure a publisher for a tragedy entitled "The Regicide." Failing in this, he became the mate of a surgeon on an expedition to Cartagena. This afforded an opportunity to study the varied life of a seaman, which served a useful purpose in preparing "The Adventures of Roderick Random," in 1748. He was editor of the Critical Review from 1756 to 1759, but was imprisoned for publishing criticisms on the government in relation to barbarities in Scotland and elsewhere. Smollett was a genial and humorous writer, his productions holding a large circle of readers and inducing translators to publish them in other tongues. His last years were spent at Monte Novo, near Leghorn, where ill-health had caused him to seek recuperation. He died there and, like Fielding, was buried in a foreign land. Among his numerous writings are "Peregrine Pickle," "Adventures of Ferdinand," "History of England," "A Tour in France and Italy," "Adventures of an Atom," "Tears of Scotland," and "Humphrey Clinker." He made a translation of "Don Ouivote" Quixote."

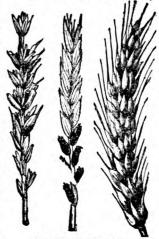
SMUGGLING (smug'gling), the offense of importing or exporting merchandise in violation of statutory law, especially without payment of duties required by the government. The practice obtained a wide foothold after the enactment of tariff duties by European countries, both on the continent and in Britain. Scott's "Red Gauntlet" and "Guy Mannering" are titles suggested by the peculiar arts practiced in bringing smuggled goods of various kinds into British possessions, the practice being quite extensive both in England and Ireland in the time of that author. In some countries smugglers were regarded as heroes, as was the case with the contrabandita of modern Spain. The British navigation laws and those intended to protect manufactures caused bold and extensive smuggling in the colonies, and many respectable business men of America regarded illicit trade with pirates and West India merchants justifiable. New York was the principal port for smugglers. That city and Philadelphia and Boston were enriched by the higher profits of illicit trading. It is estimated that goods to the value of \$4,000,000 were smuggled into France under a high protective

The smuggling carried on at present in America is largely in articles of luxury, which are in many cases ingeniously concealed from the view of customhouse inspectors. It is not infrequent for persons landing on our shores to conceal them sewed in their hair, or by having them sewed in their clothes. In some regions there has been a considerable disposition to quite common among the so-called moonshiners

of the mountain regions in several southern states. The penalties for this class of smuggling are very severe. Some writers have suggested that free trade, or a very liberal tariff without any prohibitive rates, is the only remedy to entirely overcome the practice.

SMUT, or Dustbrand, the disease induced in higher plants by parasitic fungi. It is found frequently in the ears of corn, barley, oats, and

rye, and sometimes in wheat. Smut usually appears as a black, sootlike powder, into which the grain and its integuments are converted. In some instances it affects various parts of the plant, especially in corn. When examined by a microscope. the black powder is found to consist of round spores, but these are so minute that many thoucan be placed on



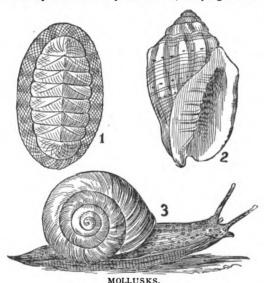
that many thousands of them Showing Healthy Head and Efcan be placed on fects of Smut in Two Others.

a square inch of surface. The smell is not disagreeable, as in some of the allied fungi. No remedy or preventive is known. Corn is infested by a remarkable kind, the ears and tassels sometimes assuming a very large size. It is thought advisable not to select seed corn from plants growing in the vicinity of infected stalks.

SMYRNA (smēr'nà), a seaport city in Asia Minor, on a gulf of the same name, now one of the largest cities in Asiatic Turkey. The Gulf of Smyrna, formerly the Hermaean Gulf, is an inlet of the Aegean Sea, on which the city has a secure harbor. Several productive islands are at its entrance and it extends inland about forty miles. The city is built partly on the plain at the shore of the gulf and partly on the gently sloping hills. The view of the city from the sea is remarkably attractive, but the visitor is disappointed in finding many illy constructed wooden buildings, filthy streets, and defective surface and sewer drainage. Railroad connection with the interior has tended to enlarge its export and import trade, though this has been of more or less importance from remote antiquity. The exports consist principally of opium, licorice, carpets, raisins, sponges, timber, tobacco, emery, olive oil, wool, cotton, silk, and live stock. Among the leading imports are glass, petroleum, paper, clothing, chemicals, and foodstuffs. It has manufactures of cotton and woolen goods, carpets, machinery, ironware, pottery, opium, and tobacco products.

Smyrna has many mosques, bazaars, churches, synagogues, hospitals, and government institutions, but none of them is of remarkable size or architecture. The city has separate quarters for the Turks, Armenians, and Jews, and the general population is very largely diversified, many nationalities being represented. It has several notable ruins of ancient temples, theaters, and walls. Smyrna is a very ancient city, its origin being lost in the traditions of antiquity. It claims the honor of being the birthplace of Homer and other great Grecians, but nothing definite is known beyond the 7th century, when it was occupied by Ionian exiles, who later joined it to the Ionian League. The Lydians destroyed it in 630 B. C., but it regained its importance under the Romans and for many years rivaled Byzantium. It was destroyed by an earthquake in 178 A. D., but Marcus Aurelius rebuilt it soon after. Tamerlane massacred its people, in 1402, and in 1424 it became a Turkish possession. At present the inhabitants include about 85,000 Turks, 42,000 Greeks, and 16,000 Jews. Population, 1917, 320,540.

SNAIL, a gasteropodous mollusk, differing from the slug in having a large, spiral shell. The species are very numerous, varying some-



1, Chiton; 2, Univalve; 3, Snail.

what in habits and size, inhabiting practically all regions where fresh water is obtainable. They have four tentacles or feelers on the head, the two longer being provided with eyes, and all of them may be extended at will. The mouth has numerous rows of small teeth and is provided with a strong, horny upper mandible, while the tongue is broad and oblong. The body is soft and underneath is a foot or sole, the latter serving to facilitate its movement as it creeps along carrying the shell on its back. Snails are most active in warm, moist weather. They close their

shell with a hardened mucus at the approach of winter, or in seasons of drought, and become inactive and torpid. When the shell and the soft parts are slightly injured, nature repairs them with remarkable completeness. In some places they effect considerable damage to garden vegetables and tender plants, on which they feed. The edible snail was a favorite article of food among the ancient Romans and is still eaten in France and other countries of Europe, where it is cultivated as a food commodity for the market. The largest snail native to America has a yellowish-white color and the shell has from four to six whorls. It is found commonly under logs or rocks, where it fixes itself to pass the winter.

SNAKE RIVER, the largest tributary of the Columbia. It rises among the Rocky Mountains of western Wyoming and, after a general course toward the northwest, joins the Columbia a short distance north of Wallula, Wash. The Snake River forms a semicircle in flowing through southern Idaho and comprises part of the boundary line between Oregon and Idaho and between Washington and Idaho. Among the principal tributaries are the Salmon, Payette, Clearwater, Boise, and Owyhee rivers. The celebrated Shoshone Falls are on its course in southern Idaho and, after receiving the Salmon River, it forms the Salmon Falls. The entire length is about 900 miles, but only 160 miles are navigable.

SNAKEROOT, the name of several plants native to North America, so called from the belief that they are useful as remedies in treating snake bites. They are distributed in many parts of Canada and the United States. A species known as Canada snakeroot is found in New England and is known for its fragrance and tonic properties. Black snakeroot, or sanicle, has a root with an aromatic taste and properties of some value for antispasmodic purposes. Seneca snakeroot grows throughout most parts of the United States and from its root is prepared the drug known as seneca. It is an acrid irritant and is used by physicians in making cough mixtures in treating respiratory catarrhs.

SNAKES, or Serpents, an order of reptiles. They are characterized by an elongated body without limbs, terminating in a tapering tail. Writers estimate the number of species at from 1,500 to 1,800. The largest types and greatest number of species are common to the tropics, whence they gradually decrease until they entirely disappear in latitudes ranging from 40° to 55° south and north. They are especially abundant in the well-watered soil of the tropics, where the glades are open to the sun, and in these haunts may be found the largest species, such as the boas, pythons, and other types capable of devouring different forms of animals that frequent such regions. Arid districts are usually infested with vipers, rattlesnakes, and other

poisonous serpents, but these types are also widely distributed in sections having a moist soil and large vegetable forms.

Writers have enumerated five general classes of snakes. These include the burrowing, tree, ground, fresh-water, and sea snakes. The burrowing snakes live almost entirely under the surface. They feed chiefly on invertebrate animals and do not include poisonous types. Tree snakes pass most of their time on trees and embrace many poisonous species. Their bodies are usually green and slender, in some cases they are colored quite like the trees they inhabit, and their food is mostly insects and animals. Ground snakes rarely enter water or ascend trees, but they are seen quite often in burrows made by other animals. Most of them are not poisonous. Fresh-water snakes swim with great ease, are not poisonous, and feed on frogs, fish, and other forms of aquatic life. Sea snakes are generally poisonous, have a rudder-shaped tail, and are unable to move on land. Snakes of all kinds rarely proceed far from the place of their nativity, unless they are deprived of food and places to retreat for safety.

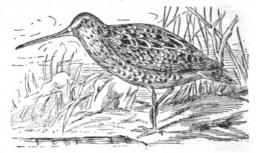
The body of snakes is covered with horny scales. Over the outside is a thin skin that is shed once each year and in some species even oftener. It first loosens at the head, and gradually peels off toward the tail, the skin being usually whole when cast off. The number of ribs varies greatly, some having as many as 300 pairs. These serve to give form to the body, aid in respiration, and are the organs of locomotion. When moving forward, the animal assumes a winding shape and gains advantage by the lower ends of the ribs acting as feet, while the scales serve to hold to the surface and aid in drawing the different parts of the body. The eyes are small and unprotected by eyelids. Although they have no external ear, they hear well and are affected by musical sounds. In all species the sense of sight is comparatively feeble. On the snout are two nostrils that indicate a high development of the sense of smell, upon which sense the animal relies quite largely in the pursuit of its prey. The forked tongue can be protruded with much facility, and is thought to serve as an organ of touch as well as taste.

Poisonous serpents have two fangs in the upper jaw and above them is a gland that elaborates the poison. Through the center of each fang is a small tube that serves for the passage of the venom, which is conducted from the glands by a duct or tube and forced into the object bitten. The poison fangs are set in a movable plate and turned back when not in use, but assume an erect position when the mouth is open. Snakes are oviparous, usually depositing from ten to seventy eggs. These are covered with a soft shell and are exposed to and hatched by moist heat. The pythons are the only snakes that defend their eggs and in-

cubate them by the warmth of the body. Many of the fresh-water and sea snakes retain the eggs in the body until the embryo is fully developed, hence these species bring forth living young. Snakes are largely flesh-eating animals and feed on insects, birds, reptiles, and small quadrupeds. They are able to swallow food thicker than themselves, a curious fact that may be observed in a small ground snake swallowing a frog, and in the boa crushing its prey by constriction through the powerful muscles of the mouth.

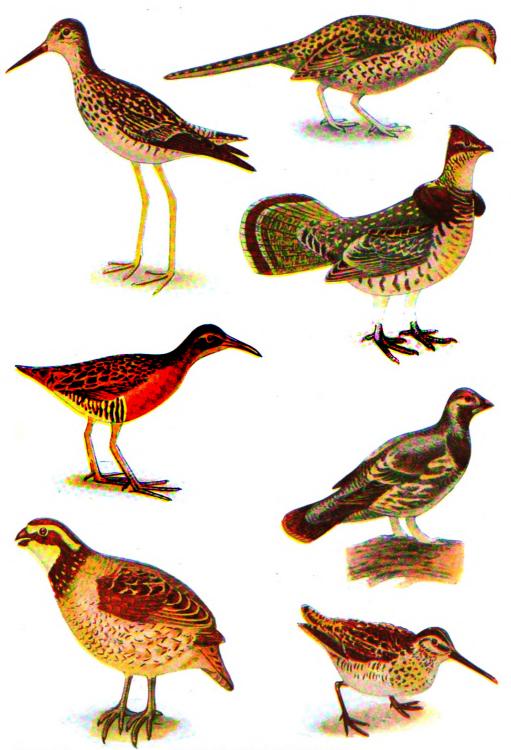
SNAPPING TURTLE, the name of a tortoise found in the fresh waters of North America, so called from its fierceness in defending itself against its enemies. The body is about twenty inches in length, though it sometimes exceeds three feet. The tail is long and the head is snakelike, but the shell is too small to permit either to be entirely covered. It has jaws of great strength and is capable of holding itself so firmly to the object it bites that it is pulled or lifted from the ground. A species known as alligator snapper is found in the lower basin of the Mississippi. The female deposits about thirty eggs in June, digging for that purpose holes in a sand bank with its hind feet. The eggs are about an inch in diameter, white in color, and nearly globular.

SNIPE, a genus of wading birds. They are common to America and Europe, frequenting the regions along the shores of rivers and lakes and the marshy places. The American, or



GRAY SNIPE.

Wilson's, snipe is found in large flocks, especially in marshes, and is a favorite for the fine flavor and nutritious quality of its flesh. is about ten inches long, has strong legs, and the long, slender bill is well adapted to search for insects and mollusks under the water. color is brownish-black above and whitish below and the voice is a peculiar bleating cry. The great gray snipe is common to the western regions of Europe. It is somewhat larger than the common snipe of America, while the redbreasted snipe frequents the shores both of America and Europe. The latter is about ten inches long with an alar extent of eighteen inches. The jacksnipe is somewhat smaller and is indigenous to Europe and Asia. Snipes com-



(Opp. 2664)

SNIPE AND OTHER GAME BIRDS.

Greater Yellowlegs Snipe. King Rail. Quail. Ring-necked Pheasant, Ruffled Grouse. Spruce Grouse. Wilson's Snipe.



mon to America move far into Canada in the spring, where they breed, and migrate southward in the fall, usually to the gulf region.

SNOHOMISH (snō-hō'mĭsh), a city of Washington, in Snohomish County, 38 miles east of north of Seattle, on the Snohomish River. It is on the Great Northern and the Northern Pacific railroads and is surrounded by a fertile farming and mining region. The chief buildings include the high school, the Masonic and Odd Fellows' halls, and several fine churches. It has extensive lumber mills, waterworks, electric lighting, and sanitary sewerage. Formerly it was the county seat, but that is now at Everett. Population, 1910, 3,244.

SNORRI STURLUSON (snor're stoor'loo-sun), historian, born in Iceland in 1179; died Sept. 22, 1241. He was a favorite of Jon Loptsson, a prominent chief, and in his home became familiar with the saga literature of Iceland and Norway. By his marriage to a wealthy woman he became the head of a large following and was speaker of laws for some time. In 1212 he visited Norway and Sweden, but the rulers of Norway suspected him of faithlessness, which caused him to lose the good will of King Haakon. He is prominent in the literature of Iceland as a poet and historian, and has been compared with Herodotus by some writers. His "Heimskringla," or "Ring of the World," embraces the history of Norway and is interspersed with numerous songs. It contains the Olaf Saga, an important part of the literature of ancient Norway. Many translations have been made, including the Prose Edda, of which Snorri is thought to be the author.

SNOW, the particles of frozen moisture which result when the air is condensed to a temperature below 32° Fahr. An assemblage of



FORMS OF SNOW.

such crystals is called a snowflake. Hail and sleet are caused by raindrops that freeze in their passage through the air, but snowflakes are formed when the vapor crystallizes, and they are enlarged in size in falling by condensing additional moisture from the air. In mild weather they are larger than when it is extremely cold. They assume a large variety of beautiful forms; fully a thousand have been classified by observers. Snow crystals are viewed

to the best advantage under the microscope when they are allowed to fall on a black surface, but the finest forms occur only in the polar regions. The star shape is the most common form. Some appear as hexagonal plates and others as hexagonal prisms, and they are often terminated by plates or a group of needles. A number of the forms of snowflakes seen after a light fall of snow are shown in the accompanying illustration.

The incident rays of light are refracted and reflected by the irregular crystal clusters and operate to give to the eye the colorless sensation of white, but when pressure is applied to bring the crystals into close contact, snow assumes the form and appearance of ice. If the temperature of the air near the surface is warmer than 32° Fahr., any snow that is formed in the upper regions melts before reaching the ground. It is in this way that the absence of snow in the tropics is accounted for, where it falls only near the summits of lofty mountains. Snow melts slowly in the polar zones, thus accounting for the large accumulations in the high latitudes, but the fall is heaviest in the cool temperate regions. Snow seldom occurs south of 36° north latitude, except in regions modified by high altitudes.

The snow line is the lower limit of the region of perpetual snow, above which the ground is covered with snow throughout the year, while below the line it melts in the warm season. The altitude of the snow line depends upon latitude. In the Himalayas, Lat. 31° N., it is 17,000 feet; in the Rocky Mountains, Lat. 43° N., 12,465 feet; in the Andes of Ecuador, Lat. 1° S., 15,800 feet; in Norway, Lat. 70° N., 3,400 feet; and in the Andes of South America, Lat. 54° S., 3,700. As a rule, that slope of a range which is exposed to the prevalent wind has a lower snow line than the opposite side. In the polar regions the snow line gradually nears the level of the sea.

Snow is an important factor in the economy of nature. It is a nonconductor of heat. Where it falls in abundance it forms a protection to the ground and thereby prevents the temperature from lowering to an extent that would injure seeds and plants. The winds are generally modified by coming in contact with regions covered with snow, while the snow melting on mountains supplies an abundance of water for irrigating arid lands and serves to replenish the rivers by its gradual conversion into water in the warm season. Glaciers are immense masses of ice and snow. They are formed by large accumulations in the snow fields situated above the snow line. Red snow was first mentioned by Aristotle, who found deposits of it on elevated mountain summits. It is most abundant in the Arctic regions and is due to the prevalence of minute organisms of vegetable growth.

SNOWBERRY, the common name of a bushy shrub of the honeysuckle family. It is

cultivated extensively in America as an ornamental plant. The leaves are simple and the flowers are small. It bears a leafy cluster of snow-white berries at the ends of the branches. The West Indian snowberry is a plant of the madder family and is cultivated in greenhouses for its white berries.

SNOWBIRD, a genus of birds of the finch family, native to North America, and commonly seen in flocks during the winter. It ranges from Mexico to the northern regions of Canada, is about six inches long, and has a slaty-gray color above with white beneath. The snowbird is often seen near houses and barns in the winter time, and in cold weather seeks shelter in haystacks and corn shocks. Snowbirds usually congregate in small flocks, and visit the barnyards in search of food. They subsist on seeds and berries. Their flesh is eaten.

SNOW BUNTING, a bird of the bunting family, widely distributed in America and Europe. It differs from the true buntings in having a long and nearly straight claw on the hind toe, and it is similar to the lark in its habits of running along the ground. In the summer time large numbers are seen far north in the Arctic region, but it moves to temperate climates in autumn. The color is a rusty-brown in winter and tawny in the breeding season, but there is less change in the female than in the male. The body is about seven inches in length and, while on the wing, it utters a pleasant song. It feeds mostly on seeds and insects. Soon after arriving in temperate regions, it becomes very fat and is then esteemed delicate food. Great numbers are killed in Greenland and dried to be eaten in winter.

SNOWDROP, a genus of early blooming bulbous plants of the *amaryllis* family. Several species are cultivated for ornament. The bulbous root produces only a few leaves and a single-flowered, leafless stem. They are native to Europe, but have been widely naturalized and greatly improved and are now grown extensively in gardens. The flower is a single white, drooping growth and issues from a scape on the flower stem. The *four-winged snowdrop* is a tree that ranges southward from Virginia. It reaches a height of fifty feet, has four-winged seeds, and bears ovate-oblong leaves.

SNOW LINE. See Snow.

SNOWPLOW, a mechanical device for removing snowdrifts from railroads and street car lines. Machines of this class are used extensively on railroads in the northern section of North America and other cold regions. Small snowplows are frequently attached to the engine pulling the ordinary passenger or freight trains, but larger machines are mounted on an eight-wheeled car and pushed forward by an engine attached to the rear end. In cases where great drifts have accumulated two engines are frequently attached, thus giving an immense propulsive power. The snowplow is so con-

structed that its cutting blades throw the snow toward both sides from the track, but in some the drift is only in one direction. Another class, the rotary plow, has buckets which scoop the snow and convey it to a hopper, whence it is blown by a fan. The rotary plow is pushed along the track by the locomotive, but the working part is operated by a special engine. With devices of this kind it is possible to remove a drift of snow ten feet deep and a half mile long in a few minutes. A smaller implement is manufactured to be drawn over the common highways by horses and over car lines by electric power. Snowplows of American manufacture have been exported to Russia and other countries of Europe.

SNOWSHOE, a device made of sinew, rawhide, wood, or some other light material, and fastened to the bottom of the foot to support the wearer in walking over snow. Those made of sinew or rawhide have a light wooden frame, over which the material is stretched, and there is a device in the center for attaching it securely to the shoe. The length varies from two to five feet and the width from one to two feet, it being necessary to have a large surface to prevent sinking into loose snow. Shoes of this kind are worn extensively by the Eskimos, Sioux Indians, and Caucasians in regions far north. The skee is a snowshoe, or skate, which is used extensively in Scandinavian countries. See Skate.

SNUFF. See Tobacco.

SNYDERS (sni'ders), Frans, painter, born at Antwerp, Belgium, in 1579; died Aug. 19, 1657. He descended from Flemish parents, studied under Peter Breueghel, and was a friend of Rubens. He visited Italy to study his art and returned to his native country in 1609, when he took up his residence in Antwerp. Rubens employed him to paint fruit and pictures of the chase, in which he excelled. Many of his pictures are in the galleries of Europe, including those in Dresden, Brussels, Antwerp, and London. His finest productions include "Prometheus and the Eagle," "Two Lions Pursuing a Roebuck," "Diana's Hunt," and "Concert of Cats."

SOAP, a substance made by uniting oils and fats with alkalies. It is used for washing and cleansing and in medicine. Soap is a chemical compound that has served valuable domestic purposes from the early historical period of Europe. It is singular that the art of manufacturing it was first learned by the Romans after their conquest of Gaul. At present there are manufactures of soap in all countries, it being a staple article of the world's commerce, and its use is firmly established among all peoples having any semblance of civilization.

The common soap of household use consists of a combination of potash and soda with certain constituents derived from oils, grease, and fats. Among the principal fats and oils em-

ployed are lard, tallow, and fish oils. In certain grades, especially in the finer soaps, it is common to use linseed, castor, palm, hempseed, olive, cocoanut, and other vegetable oils. The particular ingredients vary according to the kind of soap wanted, depending upon the different purposes for which it is intended. The three classes of soap may be grouped as soft soaps, coarse household soaps, and fine soaps.

Soft soap is a compound of potash, or soda and potash, with the fatty acids derived from the dry oils, such as linseed oil, whale oil, and fish oil. It is soft and pasty to the touch and dissolves more readily in water than hard soap. Soda and tallow are the chief ingredients in manufacturing coarse household soaps. Resin is added in making yellow soap. Mineral and other colors added in the process of manufacture produce the mottled soap, while the fine soaps generally contain carbonate of soda and olive oil. The toilet soaps are usually highly perfumed and nicely colored. The grades intended for medical use are prepared of olive or almond oil and caustic soda. Soap intended for general household use is made by boiling the potash and soda with the fats and, after the soap rises to the top, it is run off into frames to be cooled and solidified into cakes. The cakes are usually wrapped in paper and boxed ready for shipment.

SOAPSTONE, or Steatite, a compact variety of talc, composed chiefly of impure hydrated silicates of magnesia. It is durable and takes a high polish, and is so named from its soapy feeling when touched by the hands in a moist condition. A variety known as freestone is cut into small blocks and heated to keep the feet warm while driving during cold weather. Some species of soapstone are ground for use in making toilet powder and others are employed in making sinks, stoves, and building stone. Extensive deposits are found in New England

and in the Lake Superior region.

SOBIESKI (sō-byĕs'kt), or John III., King of Poland. See John III.

SOCIAL DEMOCRATS, the name applied to a body of socialists, whose aim is to carry on industry for the benefit of society as a whole, instead of recognizing the competitive methods existing at present. There is a noticeable growth of sentiment in favor of forming a socialist party, both in America and Europe, though the advocates differ widely in different countries as to the principles declared essential to reorganize society, or to bring about improvement in economic conditions. As a general rule economists do not favor socialism and, instead, reject it on the ground that science does not support it. As a whole it may be said that the great majority who favor a political socialist party are rather social reformers than socialists in a direct sense. The first attempt to embark in the political campaign in the United States took place in 1900, when Eugene Debs received 94,552 of the popular votes for President. In the campaign of 1904 there was a division and two parties resulted, Debs being the candidate for President of the Social Democrats and Corregan of the Social Labor party. The former received 397,208 votes and the latter, 32,516 votes. In Illinois Debs received 69,225 votes, the largest in any one State, and more than 25,000 votes were polled for him in each California, New York, Ohio, and Wisconsin. The heaviest vote polled for Corregan was in New York, 9,127 votes. In the election of 1912 the party polled 948,517 votes in the country.

Much attention was attracted to the heavy vote polled in Germany in the election of 1903. In that year the party polled 32 per cent, of the total number of votes cast and elected 81 members to the Reichstag out of a total membership of 397. However, the membership increased somewhat in 1914. The vote of the social democrat party in that country is shown in the following table:

YEAR.	SOCIALIST VOTE.	MEMBER SHIP.
1871	124,655	2
1874	351.952	9
1877	493,288	12
1878	437,158	9
1881	311.961	12
1884	549,990	24
1887	763,128	11
1890	1,427,298	36
1893	1,876,298	44
1898	2,107,076	58
1903		81
1914	4,250,399	110

In the United States socialism is supported by 150 periodicals. The leading publications include the Social Standard, Pittsburg; Cleveland Citizen, Cleveland; Social Democratic Herald, Milwaukee; People, New York City; Appeal to Reason, Girard; Volkzeitung, New York; and Chicago Socialist, Chicago. Belgium, Italy, Austria, Denmark, France, Russia, England, and Japan each have socialist parties or associations of more or less strength and the movement is supported by a number of periodicals in each of these countries. The socialist vote polled since 1916 in the countries of the world where the party has been organized is reported as follows:

Netherlands 65,743	[United States 598,516
	Australia1,441,270
	Belgium1,501,346
	France2,120,406
Great Britain 1,342,196	Germany4,259,020

SOCIALISM (so'shal-iz'm), the term variously applied to theories of social organization, which aim to reorganize society on the basis of cooperation rather than competition. It is applied in a loose sense to all schemes for abolishing social inequality. When employed in this aspect it is generally designated as Utopian socialism, which strives to build up an ideal state of society founded on principles of justice. Scientific socialism is a term applied to an economic theory. It affirms that the material from which labor produces wealth, that is, land,

should be the property of the community instead of individuals. Socialism is older than political economy, but in the last century it took on many new phases and won a much larger following than was previously attracted to it. The growth of socialism has been so rapid within the last fifty years that many writers speak of it as a new theory of government, which is a correct view only when applied to its influence upon the present aspect of political parties in constitutional governments, in which socialism under various names has entered into the public policy and institutions through the development and growth of organized parties.

While an ideal socialistic state of society aims to vest in the government functions to control the organization of all the industries of the country, socialism as a political force is seeking to stimulate the gradual adoption of certa n reforms, such as government control of telephones, telegraphs, railroads, mines, and other industries, aiming of course to extend this control as the conditions of society warrant. Its advocates argue that socialism is but the highest state of evolution in society, and that by a process of natural development it will ultimately secure recognition as a fundamental principle in government. They cite the fact that slavery was once an extensive institution, but gave way to feudalism, while feudalism was succeeded by capitalism, and capitalism will necessarily be replaced by socialism.

Modern writers have produced an extensive literature on the subject, which is constantly influencing thought among the laboring and industrial classes, both in America and Europe. The earliest influential socialist of England is Robert Owen (1771-1858), and F. M. C. Fourier is a noted advocate of that theory in France. However, the most eminent writers and advocates of this school of economy are German and Russian. Socialism in Germany had its rise preceding the Revolution of 1848 under the leadership of Karl Marx and Friedrich Engels, and as early as 1890 the socialist party had a powerful political organization, sufficient to elect about one-half of the representatives in the legislative bodies. However, the tendency among the socialists of Germany and other European countries is to modify their theories by assuming a more compromising attitude toward other political parties, and in this way to secure a gradual introduction of their theories. Social Democratic party of America was formed in Chicago, in 1897, as an organization succeeding the American Railway Union, which was dissolved at that time. Eugene V. Debs became the leader of the new party, which declared its purpose to be the uniting of all persons who are in favor of the cooperative commonwealth as a substitute for the present competitive system.

Christian socialism claims to be the result of applying the teaching of Christ to national, so-

cial, and commercial life, and not merely to personal conduct. It partakes rather of the aspect of a religious organization than a political influence. The advocates of this theory of government urge the view that Christ dealt more largely with the principles looking to the betterment of the conditions of life in this world than with organizing a future state. They maintain that He placed the community before the individual and taught that the foundation of society is brotherhood, not competition for profit. They hold the view that a really Christian society is socialistic, hence they adopted the name of Christian Socialists. See Feudal System; Labor; Political Economy; Serf; Slavery, etc.

SOCIAL SETTLEMENT, an association of individuals for the purpose of improving the educational and industrial conditions of the poorer classes. Settlements of this kind are maintained in the poorer districts of certain cities and are promoted by men and women of culture. Toynbee Hall, named after Arnold Toynbee, was established in the White Chapel district of London in 1884 and is one of the earliest social houses or settlements to be founded. The College Settlement, in New York City, and the Hull House, in Chicago, were opened in 1889 and are among the earliest of the settlements in America. They were soon followed by the Chicago Commons, Chicago, and the University Settlement, New York City, and many others. Institutions of this kind are now maintained in the leading cities of the world, including Berlin, Chicago, London, Paris, New York, and many others. The courses include physical, educational, esthetical, and industrial training. Religious instruction is nonsectarian and is confined largely to Sunday talks. All branches of economic art receive attention, especially spinning, weaving, gardening, dressmaking, fruit growing, and domestic economy. See Addams, Jane.

SOCIETY ISLANDS (sô-sī'ê-tỹ), an island group in the South Pacific, lying directly east of Australia and south of the Hawaiian Islands. It consists of thirteen main islands and a large number of smaller ones. The group has an area of 650 square miles. Tahiti is the principal island. The surface is generally elevated, with mountains of considerable height. A ridge of highlands extends across Tahiti, which terminates in Mount Orohena, height 8,500 feet. Other summits reach elevations ranging from 3,500 to 6,980 feet. The climate is mild and healthful and the soil is generally fertile. Among the chief productions are cotton, coffee, sugar, guava, lemons, oranges, and other tropical prod-The shell fisheries possess considerable value and it has deposits of minerals, such as clay, iron, and granite. Horses, swine, cattle, sheep, and poultry are grown in abundance.

The Society Islands were discovered by the Portuguese in 1606, and were first visited by the English in the time of George III., in 1767.

Captain Cook explored the islands in 1769, naming them in honor of the Royal Society of London. France established a protectorate over them in 1844 and the entire group is now a French colony. The government is administered by a resident governor, who is assisted by a council. A general council elected by popular vote has more or less legislative power. Steamboat lines are maintained between Tahiti and San Francisco and the Hawaiian Islands. The colony has considerable export and import trade. About 50 per cent. of the commerce is with the United States. Papeete, on Tahiti, is the principal town and seaport. Most of the inhabitants are Malays. Population, 1916, 18,685.

tants are Malays. Population, 1916, 18,685.

SOCIOLOGY (sō-shǐ-ŏl'ō-jy), the science which treats of the constitution and development of human society. It analyzes and classifies social facts and embraces an explanation of the history and first principles of social phenomena. As a branch of natural philosophy it is closely associated with ethnology, political economy, comparative jurisprudence, social and political history, and the comparative study of religions. Plato made a careful study of society in ancient times, as is set forth in his "Laws" and "Republic," and Aristotle made a scientific classification of social facts in his "Politics."

The word sociology was coined by Auguste Comte, who is the earliest of the modern writers on this subject to give it a place of more than ordinary prominence. He spent twelve years in preparing his course of "Positive Philosophy," which embraces the social doctrine known as Positivism and treats of the entire wants of man as an intellectual being. Another epoch-making work is Herbert Spencer's "The Study of Sociology," in which he treats society from the standpoint of evolution. He advances the view that societies are initiated by military and industrial influences, but overlooks the important feature of critical and legal reconstruction through the enlargement of intelligence. As man becomes conscious of the benefit of society, he naturally attempts to defend and improve it. In the evolution of laws and institutions, natural selection works quite as prominently as in the case of individuals. Those that do not benefit society usually disappear, though frequently only after long periods of time, and the survival of the fittest, even if realized, is not apparent or understood at its inception. Some writers describe society as an organism, itself made up of a multitude of conscious organisms.

SOCRATES (sŏk'rā-tēz), eminent Greek philosopher, born in Athens about 469; died in 399 B. c. He was the son of a sculptor named Sophroniscus, under whom he learned the same art, which he practiced in early life. A group of the Graces, formerly situated on the road to the Acropolis, is the most noted of his sculptures. His education included gymnastics, music, geometry, astronomy, and philosophy, and

he had training in the thought and culture of the Greek leaders. He served as a common soldier in three different campaigns, winning the praise of his friends for deeds of remarkable bravery. The first of his larger military successes was in the campaign of Potidaea, in 432-429 B. C.; the second was in the battle of Delium, in 424; and the last was a march with Cleon against Amphipolis, in 422. His ability as a scholar and teacher won many supporters; thus, he became an important factor in political life, and two memorable occasions bring him into historical notice. The first was when he served as the presiding judge on the occasion of the trial of ten officers who had neglected to bury the bodies of the killed after the Battle of Arginusae, in 406. At that time the Greeks made a great public clamor that the offenders should be punished and the court wished to proceed even without observing legal form, but Socrates refused to put the question. The other instance was when he and a number of other citizens were requested by the tyrannical government of the Thirty to take part in the confiscation of property, which he refused to do, even at the peril of his life.

Socrates withdrew from public service soon after and devoted himself to philosophy and the instruction of pupils. He practiced plain living, showed remarkable indifference to heat and cold, and was a familiar figure on the streets of Athens, where he became distinguished for his fund of humor and his power of argument. It was his aim to support right for right's sake, to seek truth for truth's sake, which made him unpopular among certain classes of Athenians. From his plan of carrying on his investigations originated the term Socratic Method. These investigations proceeded from propositions generally received as true, and in connection with them he placed the particular statement to be examined in a variety of combinations, thus implying that each thought must, if true, be maintained as valid under every possible combination. Xanthippe, his wife, is assumed to have been a scold. It is alleged that he married her to secure a discipline which would aid him in solving the philosophy of life.

Greece had emerged from the conflict with despotism at the time of Socrates' birth and was embarked on its great career of literary, philosophical, and political activity. Athens was becoming the greatest city in the world, being renowned for its academies, schools, and men of thought and action. Among the eminent philosophers of that time Socrates was preëminently the moralist, and he saw the bearing of false philosophy on the daily conduct of the individual as well as on the larger affairs of state. Though he conformed to the outward ceremonies of the national worship and spoke of the gods with reverence, he frequently referred to the existence of one Supreme Being who, unlike the gods of Greece, was uniformly SODA 2670

wise and just. While establishing no particular school, he addressed those that gathered about him on the street and in public places, thus exercising a wide influence on the opinions of young men by his methods of detecting ignorance and suggesting the path of real knowledge. His discourses were largely concerned with human duties and happiness. To impress the fulfillment of life's functions, he endeavored to

widen knowledge of human nature.

A formal indictment was preferred against him by the tragic poet Meletus, who charged that he committed the crime of not acknowledging the gods held sacred by the city and that he had corrupted youth. He appeared for trial before the Heliaea, the most numerous and important court of Athens. The defense which Socrates made is usually called the "Apology" and is one of the writings of Plato, though it is thought that at least a part of this work was interpolated by the latter. The vote taken condemned him by 281 to 220, and, although he expected the condemnation, he was surprised that the majority was so small. He was given opportunity to escape, but refused. In accordance with the decision of the judges he drank the fatal hemlock with composure thirty days after his sentence. His last days were spent in discussing the immortality of the soul in the presence of his friends, who, in different times of his life, included Plato, Aeschines, Antisthenes, Euclid of Megara, Aristippus, Alcibiades, and Xenophon. Plato in his "Phaedo" fully describes the death of Socrates, and closes by saying: "This was the end of our associate; a man, as it appears to me, the best of the men of that time with whom we were acquainted, and besides this, the most wise and just.'

SODA, chemically, an oxide of sodium, but the term is applied in ordinary language to an impure carbonate of soda, which is used for glass making, washing, and hard soap. Carbonate of soda is usually manufactured from common salt and from the mineral cryolite, a double fluoride of sodium and aluminum, of which large quantities are found in Greenland. It is a white powder, is soluble in water, and attracts water and carbonic acid from the air. Large quantities are manufactured for the trade. It is sold extensively in small boxes and cans.

SODA WATER, an effervescent drink, consisting of water strongly charged under pressure with purified carbon dioxide gas, usually entirely free from soda. It is so called because the gas with which it is charged was formerly generated from sodium bicarbonate with an acid. Large quantities are sold annually, mostly in the warmer season as a refreshing drink, and it is taken principally in cases of debility of the stomach. To flavor it a fruit syrup is added, such as the syrup of lemon or strawberry, and it is sometimes enriched with cream. Soda water is prepared by the vender by means of a fountain. A form of soda water called

pop is flavored and put into bottles, in which form it is sold in the market.

SODIUM (so'di-um), a metallic element of the alkalies, of which soda is the oxide. It is closely allied to potassium and has a bluishwhite color and a high luster. The specific gravity is .972. It melts at 204° Fahr., readily oxidizes in the air, and decomposes when dropped upon water. Sir Humphry Davy obtained the metal of sodium in 1807 soon after he had discovered potassium. Nearly 40 per cent. of the immense quantities of common salt that exist in the ocean, in the deposits of rock salt, and in the brine springs may be classed as sodium. Many compounds of sodium have been studied, the uses of which are very numerous in the manufactures. Soda is obtained from sodium. It yields protoxide of sodium, carbonate of sodium, and hydroxide of sodium, the last mentioned being frequently called caustic soda. To obtain protoxide of sodium, the sodium is burned in oxygen or dry air, while hydroxide is the product of the reaction of sodium with water. Common salt is a compound of chlorine with sodium. Plants growing near or in the sea contain more or less sodium and it also occurs in many animal fluids. Many uses are made of sodium and its compounds in the medical practice.

SODOM (sŏd'ŭm), an ancient city of Syria, which is mentioned frequently in the Bible in connection with Gomorrah. These two cities were situated near the southern shore of the Dead Sea, though this is disputed by some writers, and it is accounted that they were destroyed for their wickedness by a shower of fire descending from the heavens, which has led to the view that their sites are covered with the waters of the Dead Sea. Other cities mentioned in connection with their history are Zeboim, Admah, and Zoar, but it is specially cited that the last mentioned was not destroyed because of Lot's supplication.

SODOM, Apple of, the name given by ancient writers to a fruit found in Palestine, especially in the vicinity of the Dead Sea. It is described by Josephus and Strabo as beautiful to the eye, but galling and bitter to the taste, and was said to fill the mouth with ashes. These writers probably have reference to a large gall caused by an insect on dwarf oaks, since they are bitter and are filled with a porous substance.

SOERABAYA. See Surabaya.

SOFIA (sô'fē-yà), or Sophia, the capital of Bulgaria, on the Bogana River, 175 miles southeast of Belgrade. It occupies a fine site on a plain between ranges of the Balkan Mountains and is surrounded by a productive region. Sofia has railroad connections with Constantinople, Budapest, and other trade emporiums and is the center of a large trade. It has a number of narrow and tortuous streets, but many modern improvements have been effected since Bulgaria

obtained its independence in 1878. It has a number of fine public buildings, several churches and schools of higher learning, a modern cathe-The streets are dral, and many mosques. lighted with electric lights. They are provided with rapid transit, telephones, waterworks, and sewerage, and several of the principal thoroughfares are substantially paved. It is the seat of the national university and of an archbishop's palace. The Romans knew it by the name of Sardica. It passed successively through attacks waged by various peoples, until it became a Turkish possession in 1382. The Russians occupied it in 1878. With the independence of Bulgaria it was made the capital. Population, 1916, 104,687.

SOIL, that part of the upper stratum of the earth's crust which furnishes nutriment to plants. It is formed partly from particles resulting from the wearing of rocks and the decomposition of vegetable and animal matters. Soil exists wherever the surface is not composed of rocks or covered with water, though the term is sometimes applied in a wider sense to the areas below water that yield vegetable forms. Drift soils are the product of glacier action, while alluvial soils are those resulting from floods and water in motion. The term subsoil is applied to the mass of earth or rock lying beneath the soil proper, and this is usually quite free from a mixture of decayed vegetable matter. The term transported soil is applied to that formed from particles of rock carried to lower regions, while sedimentary soil results from the disintegration of rocks whose particles are not transported. Soil varies in appearance, composition, and fertility according to the particles forming it, and the particular class of crops that may be profitably cultivated is largely dependent upon its constituents. Among the different substances forming soil are lime, silica, alumina, soda, magnesia, ammonia, and alkalies.

All soils contain a considerable quantity of moisture. They hold intact various metallic oxides as well as hydrogen, oxygen, carbonic acid, and other gases. The fertility of the soil on hillsides gradually decreases by the water resulting from rains, which washes the more productive parts into the valleys. For this reason it needs to be replenished with manures more frequently than the soils of the more level lands. This circumstance accounts for the fact that the best lands for cultivation and pasturage are found in the valleys along rivers and among hills. Soil loses productiveness by continuous cropping, especially if the crops are not alternated. In arid regions the subsoil is of great importance in retaining moisture, especially if constituted of such strata as serve to prevent the rapid passage of moisture through it. This is especially true if the subsoil is not located more than two to five feet below the surface soil.

SOKOTO (sō'kō-tō), a town of Africa,

situated in the Niger Territories, on the Sokoto River, a tributary of the Niger. It has a number of mosques and several government buildings constructed by the British. The manufactures include cotton goods, utensils, jewelry, and earthenware. The streets are regularly platted, but they have been illy improved, and the city is surrounded by a wall. Sokoto was formerly the capital of the Fulah kingdom, an extensive region now included in the Niger Territories. It is a British protectorate. The city has a population of about 75,000.

SOLAR ENGINE (so'ler), an apparatus in which the energy of solar heat is utilized as a motive power. The problem of originating a system which will successfully employ the heat of the sun as a propelling force, next to perpetual motion, has engaged the attention of many who have sought for a convenient and inexpensive power to drive machinery. Small air engines have been operated with considerable success through the agency of expanding air, which has been made possible by the use of large mirrors. In 1901 a solar engine was constructed on this principle. It has a large mirror of a circular form and the rays of the sun are reflected upon a small boiler set in the direction of the sun, the position within the circular mirror being such that the rays are reflected upon it from all sides. The water within the boiler is thus converted into steam and conducted to an engine, by which a pump or other machinery may be put in motion. It is necessary to properly adjust the mirror in the morning so as to catch the rays of the sun, and by means of a system of clockwork it is turned so as to keep in proper position as the sun passes through its course during the day. Solar engines develop several horse power, depending upon the condition of the atmosphere, but are not serviceable during the time of a cloudy sky

SOLAR MICROSCOPE (mī'krō-skop), an instrument which throws the magnified image of the object illuminated by the sun's rays upon a wall or screen. It is used to facilitate the study of minute objects. The common solar microscope consists of a mirror for reflecting a beam of sunlight through a tube, which sometimes is fixed in a window shutter; of a condenser or large lens for converging the beam upon the object; and of a small lens or magnifier for throwing an enlarged image of the object at its focus upon the screen or wall in a darkened room or box. The lime light can be employed successfully in this instrument, instead of the sun's rays. One that uses such a light is called an oxyhydrogen microscope.

SOLAR SYSTEM, the sun and the group of celestial bodies which, held by its attraction, revolve around it. It has the sun as its center. Besides the sun, it includes the major planets, with their satellites; the minor planets, or asteroids; and the comets. In it are comprised

the meteoroids, the matter that furnishes the zodiacal light, and the rings of Saturn. The fixed stars are not included in our solar system, but are supposed to be the centers of other solar systems quite similar to our own. nebular hypothesis (q. v.) accounts for the development of heavenly bodies. According to it all the matter composing the bodies of the solar systems was scattered very thinly through the untold vastness of the celestial space, but gradually centers of attraction formed, and these centers pulled in toward themselves other particles. This process went on for countless ages, swifter in some regions of space than in others. The sun was undoubtedly the first of these centers to assume shape and large form, and afterward other centers formed and gathered particles with more or less rapidity, thus constituting the planets and other heavenly bodies. See Planets.

SOLDER (sŏd'er), a fusible alloy used for joining metallic surfaces or margins. It must be more highly fusible than the metal or metals to be united, and with this object the components and their relative amounts are varied to suit the character of the work. In the ordinary process of soldering small particles, two metallic surfaces are placed together, and a small quantity of solder is melted from the stick or cake by a soldering iron, which has been previously heated in a furnace. The hot iron is applied to the joint for the purpose of forming the solder into a uniform fluid and, after equalizing its distribution, the exposed surface is carefully smoothed. It is necessary to have the surfaces cleaned perfectly by scraping before joining them, and generally muriatic acid or sal ammoniac is used to remove all particles of foreign matter, else the solder will not become firmly fixed. A hard solder made of gold and copper, or gold, copper, and silver, is employed for soldering gold; while a solder of silver and brass is used in soldering silver. The soft solders used in ordinary work are formed of equal parts of lead, tin, and bismuth, or equal parts of lead and tin.

SOLDIERS' HOMES, the institutions built and supported by the government for the care and maintenance of soldiers honorably discharged from service, whose disability prevents them from earning their living. The first to be constructed were under the national government, but later many states founded and now maintain extensive institutions of this kind. present about 25,000 soldiers are provided for in the soldiers' homes maintained by the national or state governments. The largest under national control is the Central Soldiers' Home at Dayton, Ohio, having 4,750 members, and the largest under state control is the institution at Quincy, Ill., where 1,050 are maintained.

SOLEY (so'li), James Russell, jurist and author, born in Roxbury, Mass., Oct. 1, 1850. He graduated from Harvard University in 1870, was admitted to the bar, and taught the English branches a year at the United States Naval Academy. In 1872 he was made professor of history and law at the same institution, and from 1876 to 1890 he was professor in the United States Navy. In the latter year he was made Assistant Secretary of the Navy, serving until 1893, when he began the practice of law in New York City. He was counsel for Venezuela in 1899 at the Paris arbitration of the boundary between Venezuela and British Guiana. He published "Foreign Systems of Naval Education," "The Boys of 1812," "History of the Naval Academy," "Blockade and the Cruisers," and "Life of Admiral Porter."

SOLFERINO (sŏl-fĕ-rē'nō), a town in northern Italy, twenty miles northwest of Mantua, in the province of Brescia. It is celebrated as the site of a famous battle between the Austrians under Emperor Francis Joseph and the French and Sardinians under Napoleon III. and Victor Emmanuel, which occurred on June 24, 1859. It terminated in the overwhelming defeat of the Austrians, who lost 20,000 men in the battle that continued for sixteen hours, while the allied army lost 18,000. The whitened bones of the slain soldiers lay on the battlefield until 1870, when they were gathered and deposited in three great sepulchers by representatives of Austria, France, and Italy. The town has a tower known as the Spy, from which the plains of Lombardy may be viewed to an advantage.

SOLID (sŏl'id), in physics, a substance that is held in a fixed form by cohesion among its particles, hence excludes any other material particle or atom from occupying the same space. In a solid the molecular attraction is stronger than molecular repulsion, but it varies greatly in different solids. This property distinguishes a solid from a liquid or a gas, which offers little resistance to influences that tend to change their shape. The term solid is applied in geometry to any magnitude that has length, breadth, and thickness. In this sense it is a part of space bounded on all sides, but the term

Matter.

SOLITAIRE (sŏl-ĭ-târ'), the name of a game of cards played by one person, supposed to have been invented by a prisoner confined in the Bastille of France. Originally the game was played with glass balls, but now it is usually with an entire pack of cards. The purpose is to play until, after consecutive manipulation, the entire number of cards is placed in consecutive order in four piles, according to the suits. The game is played variously, hence requires the use of a manual for definite information.

volume is sometimes substituted for solid. See

SOLOMON (sŏl'ô-mun), meaning peaceful, the third King of Israel and the most noted sovereign of the Israelites. He was the second son of David and Bathsheba, and was selected by his father as successor to the throne in prefer-

ence to his elder brothers. The successful reign of Solomon extended for the period of forty years, from 1015 until 975 B. c. The treasures left by his father were applied judiciously in perfecting the political institutions of the kingdom. He extended commerce, encouraged industrial arts, and gave to Hebrew worship the height of magnificence by constructing a temple of great beauty. He is noted as a wise and judicious ruler, who won the hearts of his constituents by successfully defending the nation against invasions. His caravans and fleets were alike effective in bringing precious woods, gold, silver, and gems to Jerusalem, while his horsemen brought steeds from Egypt, and his architects constructed fortifications and palaces and reared cities. Toward the later part of his reign his court became noted for its magnificence and luxury. However, he brought foreign women into his harem, who persuaded him to tolerate and worship their idols. Slowly opposition to the extravagance of the government became manifest and when his son, Rehoboam, succeeded to the throne, the kingdom became divided. The Jews still celebrate the reign of Solomon as the most prosperous epoch of their history. The name of Solomon is connected with three canonical books of the Old Testament-the Song of Solomon, Proverbs, and

SOLOMON, Song of, or Canticle, a book of the Old Testament, constituting a lyric poem in the form of a dialogue. The principal subject treated of is chaste love, which, in its purity and faithfulness, is canonized in this book. It was interpreted allegorically of God and his people by the rabbis. The Christian church followed this method of interpretation, but referred the allegory to Christ and the church. Love is here described as the strongest and holiest of human passions, as the strongest sentiment of mankind, being a flame of Jehovah which cannot be extinguished. Although no satisfactory date of the time and authorship are known, it is probable that the book belongs to the time of Solomon.

SOLOMON, Wisdom of, a book of the Apocrypha, sometimes called the Book of Wisdom. It consists of three parts. In the first it attacks the philosophy of Greece, especially that of the Epicureans, and it is shown that spiritual ruin comes to those who are absorbed in worldly affairs. The second part eulogizes wisdom and relates how Solomon came to choose it for his companion. In the third part the influence of wisdom upon the history of Israel is illustrated, and the evils of folly practiced by the heathen nations is put to scorn. See Bible.

SOLOMON ISLANDS, an island group in the Pacific Ocean, lying east of New Guinea and north of the New Hebrides. It is one of the most extensive groups in the Malay Archipelago, containing a large number of more or less important islands. The total area is about 16,000 square miles. The group is well watered. It has a damp climate and several chains of lofty mountains, some of which attain heights of 8,000 feet above the sea. The highlands have a climate favorable to Europeans. Among the principal products are yams, cocoanuts, rice, cotton, fish, poultry, swine, sugar, and many species of tropical fruits. These islands were first discovered by the Spanish in 1567, but were rarely visited until in the last century. By a treaty between Germany and Great Britain, in 1885, the islands became possessions of these two nations, the northern part being subject to Germany and the southern part to Great Britain. A considerable trade is carried on by both countries, but the interior of the islands and the inhabitants have not become well known to They are Polynesians of small Europeans. stature and speak a language of the Malay type. Population, 1916, 182,500.

SOLOMON'S SEAL, a class of perennial herbs of the lily family, allied to the asparagus. The leaves are sometimes eaten as greens. The stem attains a height of from six inches to four feet, bearing sessile leaves and nodding, greenish flowers. A number of the species are native to North America, especially the great Solomon's seal. Several species are common to Europe. These plants bear a bluish-black berry, which is purgative. In most species the rootstalks are thick and knotted, with scars on their upper surface, due to the falling away of old stems growing vertically.

SOLON (sō'lun), the great legislator and one of the seven wise men of Greece, born in Athens in 638; died in 558 B. c. He descended

from a distinguished family of Attica and not only acquired a liberal education, but enriched his mind by traveling. His travels were principally in connection with commercial enterprises, in which he became engaged because of his father having lost much of his wealth. The martial inclination of the Athenians had



SOLON.

been erushed by reverses, but Solon revived the spirit of nationality and stirred his countrymen to recover Salamis. This he effected by writing patriotic poems, which were heralded throughout the nation, and he shared in the glories by having charge of the command of the army sent from Athens. Subsequently he was a highly influential citizen and became chief archon in 594 B. C. It was a period of conflict between the peasants and nobles, but by wise application of his authority a revolution was prevented.

Solon wrote a new constitution that enlarged the powers of the assembly. This document made property instead of birth the basis of citizenship, thus admitting the common classes as factors into the government, and it vastly improved the economic conditions by abolishing the provision under which a debtor could be reduced to slavery by his creditor. Luxury in dress and food were prohibited, the ownership of land was limited, and the general education of youth in schools and gymnasiums was provided for by statutory law. The statutes of Solon were written on pieces of wood and the Athenians were bound by oath not to repeal them for ten years, after which he went on extensive travels to avoid being requested to alter his laws.

He spent ten years in traveling through Asia Minor, Cyprus, Egypt, and Lydia, but, on returning to Athens, he found that the greed of the nobles had again caused serious dissensions. All parties still had such confidence in him that they readily submitted to his decisions, but later Pisistratus seized the sovereignty and overthrew the political constitution, though he allowed the social legislation of Solon to remain in effect. The story is told that Croesus, King of Lydia, asked Solon to state who could be counted the happiest man, when he replied: "Tellus of Athens, who died at the time his country was prosperous and just after he had defeated its enemy." Not satisfied with the reply, Croesus asked a second time, when Solon answered that in his judgment two Argive youths could be counted exceedingly happy, because the gods had permitted them to die in their sleep as a reward for an act of kindness. Few of the writings of Solon have come down to us, those generally considered from his pen being included in the collections of the Greek gnomic poets.

SOLSTICE (sŏl'stĭs), the period in the annual revolution of the earth around the sun at which it reaches its greatest northern or southern declination. This gives rise to two solstices in the year. The summer solstice occurs on June 22, when the sun shines directly upon the Tropic of Cancer, while the winter solstice takes place on Dec. 22, at which time the sun appears to traverse the Tropic of Capricorn. The sun is said to stand still for several days before and after the solstice, owing to the apparent declination of its rays being very slight.

SOLUTION (sō-lū'shūn), the process by which a body is absorbed into a liquid, by means of a fluid termed the solvent, or menstruum. The product is also called a solution, and may be formed of a solid, a liquid, or a gas. Thus, if water is poured upon a quantity of sugar, the solid sugar will take on the liquid form, the water serving as the solvent. Water dissolves many solids and is used extensively as a solvent, but some solids require alcohol,

ether, and other liquids to become dissolved. Only a given quantity of a solid can be dissolved in a liquid, since adhesion and cohesion balance each other at a given point, when the liquid is said to be saturated. Some solids are partly dissolved by heat, as gum camphor, but there are notable exceptions, as in the case of water immediately above the freezing point, at which temperature it will dissolve a larger quantity of lime than when at the point of boiling. Many liquids dissolve other liquids and gases, as in the solution of alcohol in water, but the latter will not dissolve oily liquids. Oils, on the other hand, may be dissolved by ether and benzene. However, water is a solvent of ordinary air and carbonic acid gas.

solway firth (sŏl'wā), an inlet from the Irish Sea, forming a part of the boundary between Scotland and England. It extends inland toward the northeast a distance of 38 miles, receives the water from the Eden and Nith rivers, and has valuable salmon and other fisheries. The tides ebb and flow with great rapidity, usually from eight to ten miles an hour, and the inflowing waves attain a height of from three to six feet. At ebb tide large

sandy tracts of the firth are left dry.

SOLYMAN II. (sŏl'i-man), or Suleiman, surnamed The Magnificent, Sultan of Turkey, born in 1496; died Sept. 5, 1566. He was the son of Selim II., whom he succeeded in 1520, and immediately reformed the civil service. After establishing schools and internal improvements, he suppressed a revolt in Syria, exterminated the Egyptian Mamelukes, and made a peace treaty with Persia. In 1521 he captured Belgrade, the key to Hungary, and in 1522 made a successful attack on the Knights of Saint John in Rhodes, who were not only defeated, but their power and influence were limited materially. His reforms at home caused a revolt of the Janazaries, but he engaged them in a war against Hungary, winning a signal victory at Mohacs in 1526, and, after capturing Buda and Pesth, he laid siege to Vienna. However, his attack on Vienna proved disastrous, being required to withdraw from the siege in 1529 with a loss of 40,000 men. He returned to Hungary with a large army in 1531, where he was successfully opposed by Charles V. of Germany, but he concluded a treaty with the French, opening the Levant to the latter, and in 1542 ravaged Nice and the Italian coasts. Peace was restored with Germany in 1547. He soon after invaded Armenia and Persia, and subsequently enlarged his dominion in Northern Africa. In 1561 he won a naval victory over the Knights of Malta and in 1565 renewed his expedition to Hungary. His death occurred while he laid siege to the Hungarian town of Szigeth.

SOMALI (sō-ma'lē), British, a British protectorate in East Africa, lying south of the Gulf of Aden and east of Abyssinia. It has an area

of 59,900 square miles. The inhabitants are largely nomadic Mohammedans, who engage extensively in stock raising, chiefly that of cattle, sheep, and horses. It produces ostrich feathers, cocoa, indigo, coffee, gum arabic, hides, and fruits. The chief imports are cotton and cotton goods. Berbera is the principal city and seaport. Other cities are Bulhar, Karam, and Zeila. The government is administered under a consul-general, who is resident at Berbera. Population, 1908, 156,500.

SOMALILAND (sō-mä'lf-land), Italian, an extensive region of East Africa, belonging to Italy. It extends from the Gulf of Aden to British East Africa and from the Indian Ocean to Abyssinia. It and British Somali include all of the Somali peninsula. The area is estimated at 115,000 square miles. Horses, cattle, and sheep are grown in abundance. Ostrich feathers, gum, wool, live stock, coffee, indigo, and fruits are the chief exports. The native inhabitants are largely nomadic Mohammedans, who are a finely formed race, but they are still in a semibarbaric state. The language is a mixture of Galla and Arabic words. Italia is the principal seaport and the capital. Bardera, near the Juba River, has a large trade. The Webi and Juba are the most important rivers. The region is quite fertile, but has an extremely hot climate and considerable desert land. Population, 416,500.

SOMERSWORTH (sūm'erz-wūrth), a city of New Hampshire, in Strafford County, on Lake Sunapee, forty miles northeast of Concord. It is on the Boston and Maine Railroad. The surrounding country is fertile, producing grasses and cereals. Among the noteworthy buildings are the public library, the high school, the hospital, and several fine churches. It has manufactures of cotton and woolen goods, boots and shoes, machinery, farming implements, and vehicles. The vicinity was settled in 1729. It was chartered as a town in 1754 and became a city in 1893. Population, 1910, 6,704.

SOMERVILLE, a city of Massachusetts, in Middlesex County, on the Mystic River and on the Boston and Maine Railroad. It is a suburb of Boston, with which it has both steam and electric railway connections, and is a favorite residence center for many Boston business men. Among its principal buildings are the public library, the State armory, the Somerville Hospital, the home for the aged, the city hall, and many schools and churches. The leading industries are tanneries, meat-packing establishments, foundries, flour mills, brick works, and machine shops. The city occupies a fine site upon seven hills. On Prospect Hill Washington raised the first colonial flag, in 1776. Other features are Central Hill, the old Powder House, and Broadway, over which Paul Revere passed in his famous ride. The place was settled about 1631. For many years it was a part of Charlestown, but was set off as a separate town in 1842. It was incorporated as a city in 1872. Population, 1905, 69,188; in 1910, 77,236.

SOMERVILLE, Mary, scientist and mathematician, born in Jedburgh, Scotland, Dec. 26, 1780; died in Naples, Italy, Nov. 29, 1872. She was a daughter of Sir William Fairfax and, after securing a good education, married Captain Greig in 1804. Her husband was a commissioner in the Russian navy and died three years after his marriage. The widow again devoted herself to consecutive study. She married William Somerville in 1812 and with her husband removed to London in 1816, where she published a number of works possessing considerable merit. A pension was awarded her in 1855 and her later years were spent in Italy. Among her most important writings are "Celestial Mechanism of the Heavens," "Connection of the Physical Sciences," "Molecular and Microscopic Sciences," and "Physical Geography." The last mentioned publication went through a large number of editions. It was long a standard text.

SOMME (sōm), a river in the northern part of France, which rises in the department of Aisne and flows into the English Channel after a course of 152 miles. Canals connect it with the Seine, the Oise, and the Scheldt. It is navigable to Amiens.

SOMNAMBULISM (sŏm-năm'bû-lĭz'm), a disorder that affects some persons during a condition of sleep. It is due to more or less activity in some of the psychical and motor areas of the brain, while the centers that preside over consciousness are slumbering soundly. While in this condition different kinds of impulses may take place, such as sleep-talking, sleep-crying, and sleep-walking. The last mentioned phenomenon is more remarkable and less frequent than sleep-talking, which is of common occurrence among the young, but there are others quite as marvelous. Numerous instances may be cited in which somnambulists dressed themselves and walked in dangerous localities with perfect safety, even over places they would fear to tread during a state of wakefulness. Other instances include riding on horseback, conversing systematically, and frequenting the places at which they were occupied during the day. These phenomena occur in almost equal proportions among males and females, but are most frequent in youth, while they usually disappear when adult age is attained. They are more common to persons of nervous temperament, but may be artificially produced by hypnotism. Sleep-walking is closely allied to hysteria and epilepsy, and not infrequently alternates with these and allied diseases

SONNET (sŏn'nĕt), a poetic composition which consists of fourteen rhymed verses, written according to a clearly defined plan. In the sonnet as perfected by the Italian humanists of the 14th century there are two parts, the first of eight verses and the second of six, known respectively as the octave and the sestet. The first

eight lines or verses make two quatrains and the remaining six form two tercets. In the quatrains there are two rhymes, the first, fourth, fifth, and eighth lines rhyming together, which is true likewise of the second, third, sixth, and seventh. While this is considered the best arrangement, other plans are often used, even in the works of Petrarch, in which the rhymes are alternate. Greater liberty is allowed in the tercets, in which the rhymes may be either two or three, but they must not occur in couplets.

The writers of sonnets are numerous, but few Americans have ever written in this style. The Romance languages, especially the Italian and Spanish, are well fitted to express fanciful feeling in the sonnet, but in English it is preferred to treat only the grave and contemplative in this style. Goethe, Uhland, Schlegel, and Tieck are the leading writers of sonnets in German; and Shakespeare, Drummond, Spenser, Milton, Mrs. Browning, Spencer, and Wordsworth, in the English. Good examples of sonnets are Mrs. Browning's "Sonnets from the Portuguese" and Milton's "On His Own Blindness."

SONS OF LIBERTY, the name assumed by a society organized in Connecticut in 1755, the object being to promote religious liberty. Colonel Isaac Barré, in a speech in Parliament on Feb. 6, 1765, applied the phrase to the party in America who opposed the enactment of the Stamp Act. The name was afterward adopted by a number of societies who favored the separation of the colonies from Great Britain, many of which were secret organizations.

SONS OF VETERANS, a society organized at Philadelphia, Pa., in 1879, to which all lineal male descendants from honorably discharged soldiers and sailors of the Civil War are eligible. This patriotic society is a companion organization of the Grand Army of the Republic, the chief society of Federal veterans. About 100,000 members belong to the society, which includes 2,000 local camps and 29 state divisions. The Daughters of Veterans is a similar organization, to which daughters of honorably discharged soldiers and sailors, as well as daughters of Sons of Veterans, may be admitted when attaining the age of fifteen years.

SONSONATE (sōn-sō-nā'tā), a town of Salvador, in Central America, 40 miles west of San Salvador. It is situated on a plain and has railway facilities by the line passing from Santa Ana to the port of Acajutla. The surrounding country is fertile, producing large quantities of sugar cane, tobacco, and fruits. Population, 1909, 18,150.

SONTAG (zōn'tāg), Henriette, eminent vocalist, born in Coblenz, Germany, Jan. 3, 1806; died in Vera Cruz, Mexico, June 18, 1854. After studying in her native city, she took an advanced and classical musical course at Prague. She was by nature a singer and appeared with eminent success at Prague when only fifteen years of age. Afterward she was given marked

evidences of appreciation in Vienna, Berlin, Paris, Hamburg, and other European cities. In 1829 she married Count Rossi, an Italian no-

bleman, but reappeared on the stage in 1849, meeting with enthusiastic reception both in America and Europe. She made an extensive tour of the United States and afterward went to Mexico, where her death occurred from exposure to cholera.

SOOCHOW (soo'-chou), or Suchau, a city in China, on the Imperial Canal, 54 miles northwest



HENRIETTE SONTAG.

of Shanghai. It has water communication with Shanghai, which is its port, and its trade is of material importance. The city is inclosed by a wall ten miles long and is divided into several parts by canals. It has extensive manufactures of silk and cotton goods, clothing, porcelain, books, and utensils. The surrounding country possesses much fertility, and the city is adorned with many beautiful gardens and parks. The inhabitants are generally cultured and refined and have good educational conveniences. Soochow has a large number of fine temples, hospitals, colleges, and government buildings. Population, 500,150.

SOOT. See Lampblack. SOPHIA (sō-fī'à). See Sofia.

SOPHIA, Church of Saint, the most celebrated and valuable edifice of the Mohammedans, located in Constantinople. It was erected by Emperor Justinian, who dedicated it in 558 as a place of worship for the Eastern Church. This noble structure remained in the hands of the Christians until 453, when Constantinople was captured under Sultan Mohammed, who replaced the cross by the crescent of Islam. The interior is richly decorated with paintings and mosaics and a fine dome surmounts the edifice. This dome has a diameter of 105 feet and a height of 184 feet.

SOPHIST (sof'ist), meaning a man of wisdom, the name given to a school of teachers in Greece, who flourished in the time of Socrates and for several decades immediately preceding, about the middle of the 5th century B.C. The period at the time of their origin was one of social and political decline and it was the main intent of the school to establish a liberal education to supplement the customary instruction in gymnastics, reading, writing, and music. It is noteworthy that the sophists held almost a monopoly of general education for nearly a hundred years, but they were considerably divided among themselves, both in their theory and practice, and many of them were mere critics of the

philosophers who had lived before. The superior grade of these teachers included Protagoras of Abbera and his disciples, Gorgias and Hippias of Elia.

The sophists taught many branches of higher learning. They consisted of the four classes known as teachers of disputation, politics, culture, and rhetoric. With the establishment of the noted philosophic schools known as the Academy and Lyceum, the philosophers took the place of the sophists as the educators of Greece. Both Socrates and Plato accused them of teaching unsocial doctrines, and alleged that they endeavored to make the worse appear the better cause of action. The later sophists were generally accused of being self-seeking and mercenary, though this view was undoubtedly overdrawn, since the sophists are known only by the writings of their antagonists.

SOPHOCLES (sŏf'ō-klēz), eminent Greek tragic poet, born near Athens in 495; died in 405 B. C. Endowed by nature with remarkable talent for music, he was early shown preferment in leading musical choruses, and at the age of 16 conducted the ceremonies in the celebration of the anniversary of Solon's conquest of Salamis. His education ranked with the most liberal given in his time to Athenian youth. When 28 years of age he won the prize formerly awarded to Aeschylus, who shortly after retired to Sicily, but on one subsequent occasion competed with Sophocles for the first prize. The latter was regarded the most scholarly and efficient poet until in 441, when the first prize was won by Euripides. However, Sophocles excelled both these great poets in the number of his triumphs, the first prize falling to him 24 different times, and he won the second on a number of occasions. In 440 B. C. he published his drama entitled "Antigone," a production of such value that it not only gained the prize, but caused his appointment with Pericles and eight other generals to command against the aristocratic party in Samos. He was a prolific writer, being credited with 130 plays, of which only seven are extant. He wrote a number of epigrams, elegies, and paeans, but few of these are among the preserved works. His writings show great mastery of human passions. They are elevated in moral tone, have purity of style, and exhibit personal dignity. Those still extant include "Antigone," "Ajax," "Electra," "Oedipus at Colonus," "Trachiniaen Women," "Philoctetes," and "Oedipus Tyran-

SORATA (sô-ra'ta), or Illampu, the highest mountain in Bolivia, situated about 16 miles east of Lake Titicaca. It is an extinct volcano. The highest point is 21,495 feet above sea level. Sir William M. Conway ascended it in 1897.

SORBONNE (sôr-bôn'), a famous college of the University of Paris, so named from its founder, Robert of Sorbon, who established it in 1252 with the sanction of Louis IX. He had been selected as the chaplain and confessor of

the sovereign at a time when the University of Paris held a place of great eminence, and decided to open an institution in which priests could teach theology gratuitously, but regulations were made to obtain the necessaries for their maintenance. The founder provided for sixteen professors, four each in the Norman, French, Picard, and English, and shortly after faculties in German and Flemish were added. Robert drew up the constitution and became the first head, and no substantial changes were made until the French Revolution. Originally destined for poor students, the Sorbonne soon became a meeting place of large numbers from all walks of life, and received many students from the University of Paris.

Theology was the only branch of study pursued. Those attending were provided with a place to live at the institution, instead of finding lodging elsewhere, as had been the early custom in France. The institution rapidly attained to a high position and became the leading theological school in Europe, attracting students from countries far remote. In it were trained the greater number of the Paris doctors. Cardinal Richelieu, in 1629, opened the present buildings in the Quartier Latin. The old university was destroyed by the Revolution in 1792, and when it was reorganized by Napoleon, in 1808, a faculty of theology was established at the Sorbonne. At present there are seven chairs in theology and, in addition, lectures are given and degrees are conferred in the branches of science and literature. Napoleon III. projected a reconstruction of the buildings. He formulated plans under which work was begun in 1884 and completed in 1889. The old church was retained on account of its artistic merit. It contained the tomb of Richelieu.

SOREL (sô-rěl'), a city of Quebec, capital of Richelieu County, 45 miles northeast of Montreal, at the confluence of the Richelieu and Saint Lawrence rivers. It is on the Quebec Southern and the Canadian Pacific railways. The manufactures include clothing, ships, earthenware, and machinery. Among the chief buildings are the county courthouse, the high school, the Carlton and Brunswick hotels, and many schools and churches. It has a large trade in grain and produce, much of which is shipped by steamboats on the Saint Lawrence. A majority of the people are French. The place was settled in 1665, when a fort was built here. Population, 1901, 7,057; in 1911, 8,420.

SORGHUM (sôr'gum), a plant which resembles broom corn and sugar cane. Several species are cultivated for the manufacture of a nutritious molasses, but in dry regions it is grown quite extensively for fodder. The sorghum plant is native to China, whence it was introduced into France, and in 1856 it was brought to America. The seed resembles that of broom corn. It is usually drilled in rows at the same time of the season that corn is planted.

SORREL

The growth is slow for several weeks after coming out of the ground, but later it grows rapidly and usually attains a height of eight to sixteen feet. It is stripped of its leaves and cut



SORGHUM PLANTS.

before frost, usually in September or October. The stalks are pressed in a cane mill for the juice, which is reduced by boiling to molasses or sugar. An acre yields from 75 to 150 gallons of molasses or sorghum. The seed is highly valuable for its nutritive quality, but is not used extensively as a food. Sorghum can be cultivated wherever corn grows, but also in more arid regions, where it is cut several times in the season as

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fodder for stock. The Kaffir corn of South Africa is a kind of sorghum. It is grown successfully for its seed and fodder in the region from Saskatchewan to Texas.

SORREL (sŏr'rĕl), a genus of perennial herbs of the buckwheat family. They are allied to the docks, from which they differ in their leaves and acid. The species common to America is the sheep sorrel, which is found in pastures and poor soil. The common sorrel of Europe has narrow leaves and grows to a height of from one to two feet. It is used in making soups, sauces, and salads. The *sorrel tree* of America belongs to the heath family and is native to the Allegheny Mountains of the South. It has white flowers and leaves about five inches long, which become crimson in early fall.

SOTHERN (su'thern), Edward Askew, eminent actor, born in Liverpool, England, April 1, 1830; died in London, Jan. 31, 1881. His parents designed to have him study for the church, but he preferred a theatrical career, playing with varied success in different parts of Great Britain. On his first visit to America, in 1852, he was not highly successful, but in 1858 he assumed the character of Lord Dundreary in "Our American Cousin" and met with distinguished success. Other chief rôles include those of Brother Gam. David Garrick, and the Crushed Tragedian. His second son, Edward Hugh Sothern, was born in New Orleans, La., Dec. 6, 1859. He first appeared with his father in 1876, playing successfully at the Abbey Theater in New York, and later played with John McCullough and John T. Raymond. His chief rôles were in "One of Our Girls," "An Enemy to the King," "The Prisoner of Zenda," "Lord Chumley," and "Captain Letterblair." In 1904 he joined Julia Marlowe in touring Canada and the United States. He is classed among the most successful actors of America, while his father is classed among the eminent players of England.

SOUL, the part of man that renders him a rational and spiritual being; the spirit that distinguishes him from the lower animals. word is sometimes used as a synonym of mind and of spirit, but each has an application not suitable to the others. Mind includes reason, conscience, and a free will, while soul in its limited use does not. The spirit differs from the soul in that the latter is always associated with a being that lives or has lived, while spirit may be applied to a being that may not have or have had such a connection. Aristotle and the Scholastics assumed that soul means the primary principle of life. They held that plants have a vegetable soul, that all animals are endowed with a sensitive soul, and that man alone has a rational and immortal soul. Their view of the superiority of the human soul was based on the fact that man has the power of mind to form abstract ideas.

All Christians hold that the soul is responsible for the deeds done in the body, but differ in view regarding the future state. Some believe that in the final judgment each soul will have its lot irrevocably fixed for eternal existence, others hold that those first punished may pass through a transitory state into bliss, while still others believe in total annihilation of the unjust. Many eminent philosophers held the doctrine of the preëxistence and transmigration of the soul, a view still commonly supported by many people. Christians are generally divided into two classes, one holding that each soul is produced by natural generation, and the other that each is separately created by God. Modern materialists regard soul a result of organism and a function of the body.

SOULT (soolt), Nicholas Jean de Dieu, Marshal of France, born at Saint-Amans-la-Bastide, France, March 29, 1769; died Nov. 26, 1851. He was the son of a notary in his native town and in 1785 enlisted as a private in the military service, rising to the rank of general in 1799. After serving on the frontier of France and Germany in the latter year, he was assigned to a division under General Massena in Switzerland and Italy. Napoleon made him a consular guard in 1802 and promoted him to the rank of Marshal of France in 1804. His eminent service in the Battle of Austerlitz caused him to be created Duke of Dalmatia, in 1807, and soon after he pursued the retreating British in Spain, conquered Portugal, and won many victories over Sir John Moore and Wellington. On Nov. 12, 1809, he won the noted victory of Ocaña, and the following year reduced all of Andalusia except Cadiz. He was obliged to retreat from Andalusia after Wellington's victory at Salamanca, when a disagreement with Joseph Bona-

parte caused him to be recalled from Spain. Napoleon soon after reinstated him and made him commander of the fourth corps of the grand army, thus commanding the center at Bautzen and Lützen. He was soon after sent to the south of France to repair the losses resulting from the defeat of Vittoria, but was obliged to surrender at Toulouse in 1814.

Soult declared himself a royalist after the first abdication of Napoleon and was made minister of war. When Napoleon returned from Elba, in 1815, Soult again became a Bonapartist and served as major general in the campaign of Waterloo. The royalists banished him after the fall of Napoleon, but he was recalled in 1819, and the following year made Marshal of France. He supported Louis Philippe after the Revolution of 1830, served as minister of war from 1830 to 1834, and in 1838 was ambassador to London for the coronation of Queen Victoria. From 1840 to 1844 he again served as minister of war, and retired from public service in 1847 with the title of marshal general. He wrote his "Memoirs" shortly before his death, and a part of the work was published by his son, Napoleon Hector Soult.

SOUND, a term admitting of two definitions: the sensation produced upon the organ of hearing by vibrations in matter, and the vibrations of matter capable of producing a sensation upon the organ of hearing. In the first use of the word there can be no sound where there is no ear to catch the vibrations, but in the latter use there can be a sound in the absence of the ear. Sound waves result when a sonorous body is struck or a person speaks, and these are propelled by molecular motion until those which fill the cavity of the ear are pressed against the tympanic membrane, when the vibration is transmitted to the auditory nerve and by it to the brain, which takes cognizance of the sensation. The air is alternately condensed and rarefied as the sound wave advances, and the motion of the air particles is alternately backward and forward in the same direction in which the wave is advancing. This motion, as in water waves, is a movement of the form only, while the particles vibrate but a short distance to and fro. Just as the length of a water wave is measured from crest to crest, so a sound wave is measured from condensation to condensation.

An elastic medium is necessary to convey sound waves from the sounding body to the ear. No sound is heard from a bell struck in a vacuum, since there is no medium in which waves may be produced to carry the sound. Air being an elastic body, it transmits sound waves readily, but they are carried also by liquids and solid substances. Solids possessing elasticity are better conductors of sounds than either liquids or gases, which may be verified by putting the ear to the ground on the approach of a horseman, or to the rail on the approach of a train. Sound travels through air at 32° Fahr. 1,090 feet per second. The velocity increases with the temperature, this being due to the fact that an increase of temperature both decreases the density and increases the elasticity. In water at ordinary temperature sound travels about 4,700 feet per second, and its velocity varies greatly with the nature of solids used as a conductor. In the metals it is from four to sixteen times that in The velocity of all ordinary sounds is the same, this being observable in the harmony maintained by a band playing at a distance, in which the soft, loud, high, and low notes all reach the ear at the same time.

Sound waves diminish in intensity in an inverse proportion to the square of the distance, and travel faster with the wind than against it. They may be reflected, refracted, and inflected. When reflected they produce echoes; by refraction they may be converged on any spot, and by inflection they may be bent around solid obstacles. Musical sounds depend upon a succession of impulses at a regular rate, the pitch of the note rising with the rapidity of the impulses. Noise is produced when smoothness and regularity are absent, as in striking several keys on a piano, or firing a gun. The capacity to per-ceive sound waves varies in different persons, the highest being roughly estimated at 48,000 vibrations per second and the lowest at 16 per second. When the number of impressions on the ear in each second is less than 16, the hearer perceives them separately, and when they exceed 48,000 the sound becomes too shrill to be audible. A speaking trumpet is a conical instrument held to the mouth of the person talking, and is used to cause the voice to be heard at great distances. The ear trumpet is employed to aid persons partially deaf in hearing, and acts to concentrate the sound of the voice.

SOUND, The, a strait of Europe, which is situated north of Germany. It connects the Cattegat with the Baltic Sea and separates Sweden from Denmark. The Sound is about fifty miles long. It is an important waterway between the North and the Baltic seas. Denmark collected toll from all merchant vessels passing The Sound from the 15th century until 1857, when the duties were abolished by an indemnity to Denmark amounting to \$16,000,000, and it was stipulated at the same time that the treaty nations must maintain lighthouses on its coasts. Strong fortifications are maintained at its entrance, the most prominent being the fortress of

Kronberg

SOUNDING, the process of measuring the depth of water and the quality of the bottom of the sea, usually by a plummet lowered from a ship. Formerly the plummet consisted of a rope on which the number of fathoms were marked and at its end was a piece of lead, but in deep water it was quite difficult to determine whether the weight had reached the bottom. Plummets are made at present by attaching an elongated lead weight, supplied at one end with an opening

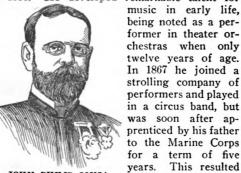
to receive the connection, at which a wire rope is fastened. Usually two plummets are carried by vessels, one weighing eight or ten pounds, called the hand lead, and one weighing 20 to 65 pounds, called the deep-sea lead. Plummets intended to ascertain the character of the bottom are usually provided with a tallow-covered device at the lower side, to which gravel, shells, sand, and other particles adhere when the lead strikes the ground. Other sounding apparatus has been devised to facilitate scientific investigation of the depth and character of the bottom, and many records are extant as a result of extensive soundings.

The Tanner sounding machine is used in depths which do not exceed 500 fathoms (3,000 feet). For greater depths the Sigsbee machine, which reels in sounding wire by steam power, is used. On both machines steel piano wire is used in place of the hemp sounding lines formerly employed, its advantages being strength, lightness, and small bulk. With it, heavier sinkers can be employed to give an up-and-down trend, and its smaller surface per lineal foot renders it less liable than the hemp lines to be diverted from the vertical by currents.

A shot weighing about 65 pounds is attached to the sounding cylinder and is automatically detached when the bottom is reached, in order to lessen the tension when reeling in. sounding cylinder used at present brings up a specimen from the bottom, while a water cup takes a sample of water within a few feet of the bottom, and a deep-sea thermometer automatically registers the bottom temperature.

The United States government recently employed the Sigsbee machine on the Albatross in taking soundings in the Pacific Ocean and found a depth of 4,813 fathoms (about five and a half miles), one of the deepest oceanic depressions in the world, about 100 miles southeast of Guam. The highest mountain in North America would be covered by nearly two miles of water if placed in this depression.

SOUSA (soo'za), John Philip, musical leader and composer, born in Washington, D. C., Nov. He developed remarkable talent for





in his becoming connected with the Marine Band at Washington, of which he ultimately became leader, a position he

retained for twelve years. He was assisted by David Blakely in 1892 in organizing the famous Sousa's band, which met with remarkable success in all parts of America and proved a profitable enterprise. Among his musical compositions are "The Liberty Bell," "Sheridan's Ride," and "High School Cadets." He is the author of several popular operas, including "El Capitan," "The Charlatan," "The Bride Elect," "The Queen of Hearts," and "The Free Lance."

SOUTH AFRICAN WAR, the conflict for supremacy in South Africa, in the years 1899-1902, between Great Britain and the republics of the Orange Free State and the Transvaal. A large immigration had been attracted by the discovery of gold in the Witwatersrand, and this influx of foreigners into the republic organized by the Boers caused them to place greater restrictions upon the rights of citizenship. These immigrants were called *Uitlanders* and they were more or less opposed to the dominion of the Boers, since they were largely British subjects and had ties in language and citizenship with the predominating influences of Cape Colony and Great Britain. In order to forestall the development of a citizenship with a majority of British sympathizers, the Boers under the leadership of Paul Kruger, the president of the Transvaal Republic, in 1887, fixed the period of residence necessary before naturalization at fifteen years. This action caused much dissatisfaction, since many foreigners were not permitted to have a voice in the government.

In 1896 the affairs were brought to a crisis by the Jameson Raid, under the leadership of Leander Starr Jameson, but this movement was discredited by the British government. This incident was in effect a victory for the Boers, who greatly strengthened their position by placing legal restrictions upon the Uitlanders and utilizing their resources so as to be prepared for an armed conflict. Negotiations were conducted with the British government, which had been petitioned by the foreign inhabitants to intercede in their behalf in a friendly way, but the diplomatic negotiations proved futile. War was declared by the Transvaal Republic in October, 1899, and the Orange Free State immediately cast its fortune with the belligerent.

At the beginning of the conflict Great Britain had about 21,500 men in South Africa. These included a force of 12,000 in Natal, 1,000 in Rhodesia, 1,000 in Mafeking, 2,500 at Kimberley, and 5,000 in Cape Colony. This was a larger force than was mobilized by the Boers, who had about 20,000 men. The forces of the Transvaal and the Orange Free State immediately invaded Natal, routed the British at Nicholson's Nek, and marched upon Ladysmith, which was held by 10,000 troops under Sir George White, and under Petrus Joubert invested that place. Another force of Boers under Cronje besieged Mafeking, which was held by Colonel Baden-Powell with 6,000 men. Large reinforcements were dispatched to South Africa and Sir Redders Buller undertook the relief of Ladysmith. In the meantime Lord Methuen was sent to Kimberley. The British suffered a defeat on the Modder River and sustained severe losses in obstinate fighting at Colenso and Ladysmith. However, the British forces were rapidly increased to 130,000 men and by the latter part of February, 1900, both Kimberley and Ladysmith were relieved.

Bloemfontein, the capital of the Orange Free State, was captured by the British in March, when Lord Roberts declared that country British territory. After remaining at Bloemfontein more than a month, Lord Roberts decided to advance on Pretoria, the capital of the Transvaal. On the Vet River he encountered a force of Boers under General Louis Botha, but succeeded in moving forward upon Johannesburg, which he entered in May. Pretoria was occupied in June, but President Kruger had removed the capital to Machadodorp, and General Botha occupied a position a short distance from Pretoria. General Buller advanced northward with a large force to cooperate with Lord Roberts, and the combined army pushed forward against General Botha, who had taken a strong position at Bergendal, where he was defeated in August. The last battle occurred in September, 1900, when the Boers were defeated at Spitzkop, after which a large number crossed the border into Portuguese territory. Lord Roberts in the same month proclaimed the Transvaal to be British territory, naming it the Transvaal Colony. President Kruger sailed on a Dutch man-of-war from Lourenço Marques for Holland in October.

The conflict now resolved itself into a struggle of small bands against superior forces. Hostilities continued until in May, 1902, when the Boers concluded to accept the terms of peace offered by the British. These included that they acknowledge themselves subject to Edward VII., that no punishment should be inflicted upon them for any acts connected with the war, that the Dutch language be taught in the public schools on request of the parents, and that a civil government be established at the earliest possible date. It was likewise provided that the government to be established should be representative and that no tax to cover the expenses of the war should be levied upon landed property. In the conduct of the war great courage was shown by the Boers, who did not exceed 75,000 men in actual service. On the other hand, the British force in South Africa during the war numbered 450,000 men and officers. Of this number 52,000 were raised in South Africa, 31,000 were sent as volunteers from British colonies, and the remainder was made up of militia and regular troops.

SOUTH AMBOY (ăm'boi), a borough of New Jersey, in Middlesex County, 35 miles southwest of New York City. It is on Raritan Bay, at the mouth of the Raritan River, and on

the Central of New Jersey, the Pennsylvania, and other railroads. On the opposite side of the river is Perth Amboy, with which it is connected by a bridge. The manufactures include machinery, brick, pottery, and clothing. It is a market for coal, fruits, and merchandise. Waterworks, electric lighting, and sewerage are among the public utilities. It was incorporated in 1898. Population, 1905, 6,258; in 1910, 7,007. SOUTH AMERICA, one of the six grand

divisions, the second in size of the Western Hemisphere and the fourth largest of the world, being exceeded in extent only by Asia, Africa, and North America. It is situated between 12° 45' north latitude and 55° 30' south latitude and between 35° 1' and 81° 30' west longitude. The extent from north to south, from Cape Gallinas to Cape Horn, is about 4,800 miles, the greatest breadth from east to west is 3,300 miles, and the area is 7,700,000 square miles. It is bounded on the north by the Caribbean Sea and the Atlantic Ocean, on the east by the Atlantic Ocean, and on the west by the Pacific Ocean. The Equator crosses the northern part and about one-third lies in the Temperate Zone, the remainder of the

continent being in the Torrid Zone.

The coasts are more uniform than those of North America. A narrow stretch of land, the Isthmus of Panama, joins the two continents. This isthmus is indented on the south by the Gulf of Panama and on the north by the Gulf of Darien. On the northern coast of the continent is the Gulf of Venezuela, on the northeast are mouths of the Amazon, and on the southeastern shore are the estuary of La Plata, the Blanca Bay, the Gulf of Saint Matias, and the Gulf of Saint George. The western coast has the Gulf of Penas, the Gulf of Corcovado, and the Gulf of Guayaquil. However, all these indentations are comparatively small. The islands are uniformly small and lie near the mainland. They include Trinidad, off the northern shore; South Georgia and the Falkland Islands, east of the southern extremity; and the Galapagos Islands, west of Ecuador. Tierra del Fuego, in the extreme south, is separated from the mainland by the Strait of Magellan.

DESCRIPTION. The cordillera of the Andes trends along the western coast, from the Isthmus of Panama to Cape Horn, forming the loftiest ranges of the Western Hemisphere. It forms a natural continuation of the Cordilleras of North America. A narrow strip of low land, averaging less than a hundred miles, lies between these highlands and the Pacific coast. About forty active volcanoes are included with the peaks, but many others, some of which are characterized by huge volcanic holes, have long been extinct. Aconcagua, height 23,910 feet, is the highest peak of South America, but many other summits approximate it in height. The greatest altitudes are reached in the vicinity of 32° south latitude, whence the surface slopes with more or less irregularity both toward the north and the south.



PHYSICAL MAP OF SOUTH AMERICA.
2682

Among the notable peaks are those of Cacaca, 20,250 feet; Cotopaxi, 19,613 feet; Antisana, 19,-335 feet; and Chimborazo, 20,498 feet.

The secondary system of highlands is located in the northern part of the continent, mainly in Venezuela and the Guianas, forming a watershed between the Amazon and the Orinoco. group of irregular mountains has a general altitude of 2,000 feet, but the highest peaks approximate 10,250 feet. A third system of highlands is situated in the eastern part of the continent, known as the Brazilian Highlands, which form an extensive plateau whose surface is much lower than the average altitude of the Andean system. The average height approximates 2,500 feet, although some of the many ranges are much higher. A large portion of the surface of the Brazilian Highlands is level, but in some sections they are cut by great cañons, and the rivers flow with considerable velocity or have extensive rapids and falls. In the eastern part it slopes quite abruptly toward the Atlantic, but in the interior it merges into a great central plain. Between the highland regions, extending from north to south, is the great plain which includes the selvas, the llanos, and the pampas.

The drainage of South America is chiefly into the Atlantic, owing to the fact that the Andes form a great and continuous watershed. Three vast river systems, those of the Amazon, the Orinoco, and the La Plata, discharge the larger part of the drainage. The Amazon, while not the longest river, discharges more water than the Mississippi and the Missouri rivers combined, hence takes rank as the largest water course of the globe. In the northern part is the Orinoco, which discharges almost as much water as the Mississippi, although it is smaller than the Saint Lawrence system. The central lowlands lying toward the south are drained by the estuary of the Rio de la Plata, which receives the Paraná, the Uruguay, and other tributaries. The estuary of this river is a lakelike expanse and the overflown territory in the rainy season resembles a shallow inland sea. In the northwestern part of the continent is the Magdalena, which drains the highlands of Colombia and flows into the Caribbean Sea. Another large stream, the São Francisco, drains a large part of the Brazilian Highlands and discharges into the Atlantic near 10° south latitude. Other streams which discharge directly into the sea or into some of the larger rivers include the Colorado, the Negro, the Chubut, the Salado, the Pilcomayo, the Tocantins, the Xingu, the Tapajos, the Madeira, the Ucavali, the Rio Negro, and the Cauca. The continent has no great lakes or inland seas, the only large body of water being Lake Titicaca, located on the border between Peru and Bolivia, at an altitude of about 12,000 feet. Lake Maracaibo, in Venezuela, is an inlet from the Gulf of Venezuela.

CLIMATE. South America has a more equable climate than North America, owing to the fact

that it lies on both sides of the Equator. However, it varies considerably by reason of differences in altitude and proximity to the sea, the colder sections being in the lofty highlands and in the extreme southern part of the grand division. Most of the tablelands near the Equator have a uniformly high temperature, the higher regions of the Andean plateaus are cold, and the southern part is extremely cold, variable, and disagreeable in the winter, especially in the months of June, July, and August. The seasons, instead of being designated as in North America, are known as the wet and dry seasons and are determined mainly by the occurrence of the equatorial rains. An enormous rainfall prevails on the Atlantic slope, especially in the northeastern part, where the annual precipitation ranges from 50 to 200 inches. This heavy rainfall extends throughout the valley of the Amazon, even to the eastern slopes of the Andes; hence the currents of air, being deprived of their moisture, move as dry winds down the western slope, where the rainfall is very scant. The driest belt is along the narrow coast of Peru and northern Chile, where the precipitation is only a few inches

FLORA. The vegetable life of South America ranges from that of the temperate to that of the tropical zone, being controlled largely by latitude, rainfall, and altitude. A large part of Colombia and Venezuela, having a hot climate and excessive rainfall, is characterized by luxuriant vegetation. The forms are tropical in character, except where the altitude is considerably above the sea. The equatorial forests are the most dense as well as the most extensive in the world, being approximated only by the vast forests of equatorial Africa. They are abundant in the valleys of the Orinoco and the Amazon, where they are known as the selvas, but nearly all parts of the grand division have an abundance of timber along the streams and in the mountains. A portion of the valley of the Orinoco, known as the llanos, is almost treeless. In the rainy season this section is covered with nutritious grasses, but vegetable forms become quite parched in the dry season, when the region of these plains resembles an arid desert. The great southern plains, known as the pampas, extend from the eastern summits of the Andes to the south central part of Argentina. They resemble the great plains of the south-central section of Canada and the Mississippi valley, having a gently undulating surface and being covered with valuable native grasses. Among the plants which are native to the continent are the potato, tree ferns, deciduous trees, several species of pampas grass, many palms and bamboos, and a large number of coniferae.

FAUNA. The animal life of South America may be said to include that of the West Indies and Central America. Since many forms are isolated and materially different from those of North America, it is believed that the two con-

tinents were formerly separated and that they were united at a comparatively recent date. Eight families of mammals belong exclusively to this grand division, including several species of rodents, many edentates, the blood-sucking bats, and two families of monkeys. It has no ruminants, except the llamas, few insectivora, only one kind of bear, and no animals related to the horse, except one species of tapir. The birds include 23 families and 600 genera, many of which belong exclusively to the continent. The reptiles include the boas, the scytales, and several families of lizards and frogs. The birds of song and plumage are well represented, including the humming bird, the tanager, the flamingo, the toucan, the parrot, and the araçaris. A large number of sea fowl and birds of prey belong to the continent, the latter including the condor, which is the largest bird of this class. An abundance of fish is found in the fresh waters as well as off the shores.

The continent is rich in many MINERALS. kinds of minerals, especially in gold, silver, diamonds, copper, iron, lead, borax, niter, and mercury. However, mining has been confined chiefly to the production of gold and silver. Gold occurs in the interior of Brazil, in southern Argentina, and throughout the greater part of the Andes. Silver is obtained in large quantities in Bolivia and other sections of the western highlands. Copper and mercury are mined in the Andes and on the northern coast. Iron deposits are known to exist in the three principal mountain systems, but this metal has not been produced extensively. Formerly Brazil was the principal source of diamonds, but the output is greatly surpassed by that of South Africa. Rich guano deposits are worked along the coasts of Chile and Peru, niter and borax are obtained in Chile, and coal is found in Brazil, Uruguay, Argentina, and Colombia. Venezuela is the principal source of emeralds and asphalt. As compared with Mexico, Canada, and the United States, the mining interests are not well developed.

INDUSTRIES. Agriculture and stock raising continue to be the leading industries. Wheat is grown extensively in Argentina and Chile, these countries competing with the production of this cereal in Canada and the United States. Coffee is grown in large quantities in Brazil, which country continues to be the chief source of this product. Brazil, the Guianas, and Venezuela have a large output of sugar and tobacco. Cacao is grown in the valley of the Amazon and Orinoco, corn is cultivated more or less throughout the tropical regions, and fruits and vegetables are abundant, except in the extremely southern part. Bolivia, Peru, Colombia, and the valley of the Amazon produce large quantities of rubber and medicinal plants. Grazing is the principal industry in a large part of the valley of the Paraná, especially in southern Brazil, Uruguay, and large parts of Argentina. Cattle are bred extensively in the llanos of Colombia and Venezuela.

The manufacturing industry has not been developed as extensively as the resources would justify. Comparatively little has been done in the production of steel and iron. Although lumber is produced in large quantities, it is exported chiefly in a semimanufactured state. Argentina, Chile, Brazil, and Peru have a considerable railroad mileage in operation. Several transcontinental lines connect the Atlantic with the Pacific. but they are confined to the valley of the La Plata. A large part of the trade is carried on the rivers, many of which are navigable for long distances; but the Amazon, the La Plata, and the Orinoco are the most important in this respect. A large part of the interior trade is carried by mules and ponies. Oxen are employed extensively for farm work. The exports consist principally of coffee, cotton, silk, borax, silver, lumber, meat, hides, tobacco, and medicinal plants.

INHABITANTS. South America was peopled by many tribes of Indians before the continent was discovered and settled by Europeans. Some of these inhabitants were powerful nations, having large cities and stable forms of government, but others constituted hordes of wandering tribes. The Araucanians were among the chief aborigines. They and kindred races occupied a large part of the highlands in the northwestern part of the continent, extending southward to Patagonia. They pursued agriculture, constructed canals and aqueducts, and maintained schools and other institutions common to an intelligent people. These peoples were either enslaved or became intermixed with the Spanish and Portuguese. At present a large element in nearly every country of South America consists of a mixture of Indian and European blood. However, many Spaniards, Italians, Portuguese, and Germans have settled in different sections. These people and their descendants comprise the leading commercial and industrial element.

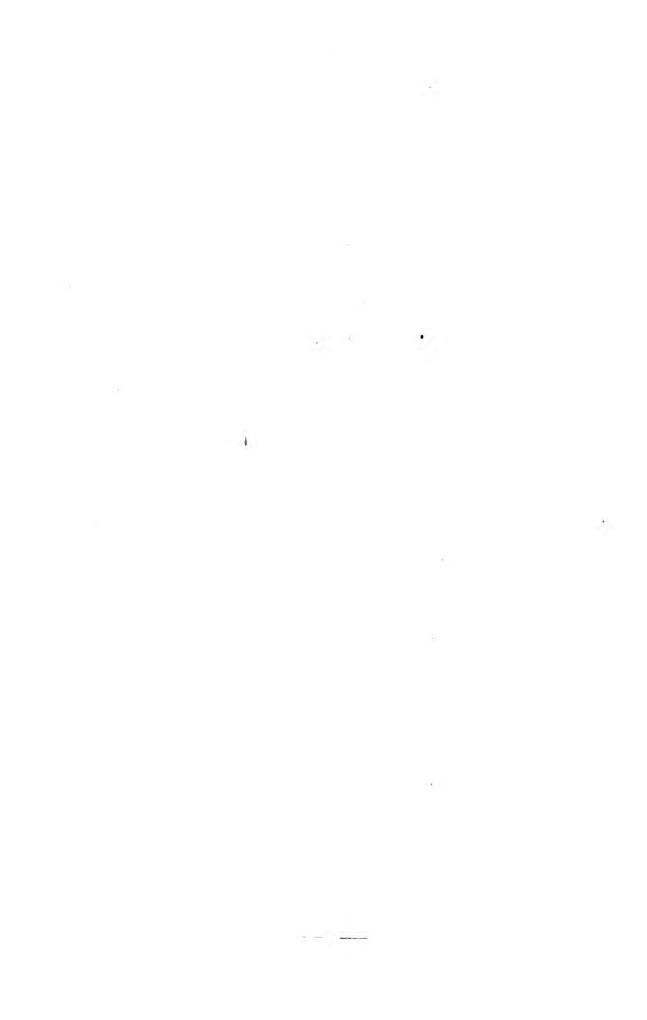
POLITICAL DIVISIONS. All the political states of South America are republics except Guiana, which is divided about equally among England, France, and the Netherlands. The countries are Panama, Venezuela, Colombia, Ecuador, British Guiana, Dutch Guiana, French Guiana, Brazil, Peru, Bolivia, Chile, Paraguay, Uruguay, and Argentina. The population, as reported by the latest census returns, is 53,850,580.

HISTORY. Columbus discovered the continent of South America in 1498, when he cruised along the northern coast and explored a portion of the Orinoco. Two years later the coast of Brazil was explored by Pinzon and Diego de Lepe. Pedro Alvarez Cabral discovered the continent independently while on a voyage to India by the route around Africa, which had been opened by Vasco da Gama. He explored the vicinity of Bahia, in the eastern part of Brazil, but he supposed this region to be a part of Asia. In 1513 Balboa crossed the Isthmus of Panama and dis-



(Art. South America)

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covered the Pacific. Magellan passed the southern point of the continent in 1520, when he discovered Tierra del Fuego and probably the Falkland Islands. Explorations were soon after made of the interior by Gonzalo Pizarro and Orellana. Cabot explored the Paraná in 1528, and Irala established an overland route from the La Plata to Peru. Many Spanish explorers devoted much time in the 16th and 17th centuries in search of El Dorado, the fabled king of a fabulous city that was supposed to exist somewhere in the northern part of South America.

The Spaniards and Portuguese began to claim all of South America as early as the 16th century, when they undertook to found colonies in different parts of the continent. Brazil was claimed by the Portuguese and Spain claimed the remainder of the coast. Later the two nations established claims to whatever lands they conquered, advancing steadily inland from the coasts. Francisco Pizarro captured Cuzco, the capital of the Incas, in 1533, and converted it into a Spanish settlement. He founded Lima two years later and made it the capital of his viceroyalty, which included the northwestern portion of the continent. Lima soon developed into an important city and became the center of a large trade. In the course of time the entire grand division was claimed by the Portuguese and the Spaniards, the former settling in the eastern part and the latter in the northern and western sections. No other European countries attempted settlements in South America, excepting only the French, Dutch, and English, who established claims to Guiana within the 17th century. These conditions remained stationary until the early part of the 19th century, when the Spanish and Portuguese colonies undertook to become freed from the dominion of the Euro-

Simon Bolivar, taking advantage of the Napoleonic Wars in Europe and the War of 1812 in North America, developed a large following and eventually succeeded in establishing republics in Peru, Chile, Bolivia, Venezuela, and Argentina. Brazil became independent of Portugal in 1823, but retained a monarchical form of government until 1889, when the present republic was established. Negro slavery maintained a foothold until 1888, when it was finally abolished. None of the nations is as powerful as the United States or the larger countries of Europe. The people seem to lack the peculiar qualities manifested by the nations of Northern Europe, by which the latter carried civilization and industry to the different regions which they colonized in North America.

SOUTHAMPTON (suth-hamp'tun), a seaport city of England, on the Southampton Water, 70 miles southwest of London. The harbor is commodious and has ample dock accommodations. Communication is maintained by railways and electric lines with many inland towns. Among

the principal buildings are the Saint Michael's Church, the Netley Hospital, the Holywood Church, the public library, the city hall, the public market, and many intermediate and secondary schools. The manufactures include sugar, hardware, spirituous liquors, vehicles, sailing vessels, steam engines, machinery, and textiles. It has a large foreign trade with the West Indies, Australia, South Africa, and the Mediterranean. The city is a fashionable resort in summer. It has fine street pavements, waterworks, street railways, and several parks. Population, 1911, 119,039.

SOUTH AUSTRALIA (as-trā'lī-à), a State of the Commonwealth of Australia, situated in the central part of the continent. It is bounded on the north by the Timor and Arafura seas, east by Queensland, New South Wales, and Victoria, south by the Indian Ocean, and west by Western Australia. Extending across the continent from north to south, it has a length of 1,850 miles. The general width is from 550 to 700 miles. South Australia proper occupies the southern part, while the northern section is known as the Northern Territory, the latter having an area of 523,620 square miles. The total area is 903,690 square miles.

total area is 903,690 square miles.

Description. The southern coast has more inlets of large size than any other part of the Australian shore, including Spencer Gulf, Encounter Bay, and Saint Vincent's Gulf. On the northern coast are Queen's Channel, Van Diemen Gulf, and the Gulf of Carpentaria; but the shores are more regularly formed than the southern. In the interior is an arid region with several mountain ranges and numerous lakes that have no outlet to the sea, the principal one of these being Lake Amadeus. Among the mountain chains of the north-central part are the Reynolds, the James, and the McDonnell ranges, and these have a general elevation of about 3,000 feet above sea level. In the southern part are the Stuart and other less important ranges, with peaks from 1,500 to 3,000 feet. As a whole, the State is a vast plain with an undulating surface, and much of the interior is a desert of sandy tracts and marshes.

None of the streams is important except the Murray, which enters the southeastern part and flows into Encounter Bay. The Macumba and the Cooper rivers flow into Lake Eyre, which has no outlet to the sea. Among the principal streams of the north are the Victoria, Daly, Alligator, Liverpool, and Gladstone rivers. The lake region of the south-central part, which is shut off from the sea by the Galler Range, has no visible outlet. The lakes within this region. besides Lake Eyre, include the Torrens, Gairdner, Frome, and Gregory lakes. During the dry season they are reduced to marshes with heavy salt crusts, but become quite deep during the periods of rains. In the interior the rainfall is very scant and the climate is extremely hot, but there is abundance of moisture and a corresponding fertility in the region adjacent to the southern coast. The dry season extends from December to March, when hot winds are frequent and the temperature rises to 118°. It seldom falls to 32°, but the climate is singularly healthful. At Adelaide the rainfall is 24 inches and in the northern part it is more abundant, ranging from 50 to 70 inches.

The coast regions are moderately timbered with string bark, gum, pine, eucalyptus, and other trees, but in the interior regions forests are either absent or limited. The State possesses little value for agricultural purposes aside from the southern and extreme northern regions, but it has excellent ranges for grazing. Water is not obtainable in some sections, and a supply of rain water is preserved in cisterns for use in the dry season. In some localities many artesian wells abound and are utilized to some extent for irrigation.

INDUSTRIES. Mining is not as important as in some of the other Australian states. Very rich deposits of copper occur and the mining of this metal is more extensive than that of any other. The absence of coal has made it impossible to work the deposits of iron ore, in which the State is rich. Other minerals include gold, lead, bismuth, granite, and limestone. The fisheries on the coast are extensive, especially in Spencer Gulf and the Gulf of Saint Vincent. The manufactures are confined largely to products that are consumed locally and include flour, machinery, canned fruits, pottery, and clothing. Flour is the chief manufactured product and large quantities are exported. Other exports include wheat, wool, wine, minerals, and live stock.

Agriculture is the principal occupation. In the acreage under cultivation South Australia ranks second among the states of the Commonwealth, but the farming district is chiefly in the southern part. Tracts of considerable size are irrigated by drawing water from rivers and artesian wells. Wheat is the principal cereal and exceeds in acreage all other crops combined. The products next of importance are hay, barley, oats, potatoes, and fruits, especially grapes, oranges, and lemons. Silk culture and the mulberry tree have been introduced successfully. South Australia has large interests in raising sheep, of which there are 5,500,000 head. Other domestic animals include cattle, horses, swine, and poultry.

GOVERNMENT. The Governor is appointed by the British crown and is aided by an executive council of six members. Two chambers are included in the Legislature, consisting of the legislative council, of 18 members, and the house of assembly, of 42 members. All are elected by the people, the former for six years and the latter for three years. The right of suffrage is vested in all without regard to sex, but a small property qualification is required. A commissioner chosen by the State has administrative authority in the Northern Territory.

The State maintains a system of public schools, at which attendance is free and compulsory between the ages of seven and thirteen years. Many secondary schools are well established, but these are either private or demoninational. The schools culminate in the University of Adelaide, which has extensive courses and adequate facilities. Technical and industrial schools receive aid from the State.

The public utilities are largely owned and controlled by the State or by municipalities. Telegraph and telephone lines, including a telegraph system between Adelaide and Fort Darwin, as well as the postal system, are owned by the government. Farmers are aided by loans on easy terms, and industrial disputes are settled largely by arbitration. Railroad building has been encouraged, but the lines are confined to the southern part. The principal railway extends from Adelaide north to a point on the Macuba River, passing in its course the southern shore of Lake Eyre. At present 2,500 miles are in operation.

INHABITANTS. The settlements are confined almost entirely in the southeastern part of the State. At the last census only 3,310 persons resided in the Northern Territory, exclusive of 1,223 aborigines. Nearly all the people are of British origin, chiefly English and Scotch, and those of foreign birth are largely Germans. In religious affiliation the people are Anglican, Methodist, Roman Catholic, Lutheran, Baptist, and Presbyterian, in the order named. Adelaide, on the Gulf of Saint Vincent, is the capital and largest city. Port Darwin is the capital of the Northern Territory. Other cities include Mount Gambier, Port Adelaide, Port Pirie, and Palmerston, the last mentioned being a port city on the northern coast. Population, 1910, 409,997.

HISTORY. Navigators from Holland, Spain, and Portgual visited different sections of the coast at various times in the 16th and 17th centuries. The first English settlement was made in the vicinity of Port Adelaide, a short distance northwest of Adelaide, in 1836. Adelaide, on the Torrens River, soon after became the capital of a prosperous colony, which attracted many emigrants by the discovery of copper in 1843. With the discovery of gold in Victoria, in 1851, a large number of colonists left the settlement, but the development of pastoral and agricultural interests rapidly increased the population. South Australia became a constitutional colony in 1856, after which the interior was explored. Northern Territory was annexed in 1863. In 1900 it joined the federation of the Commonwealth of Australia.

SOUTH BEND, a city in Indiana, county seat of Saint Joseph County, on the Saint Joseph River, 85 miles southeast of Chicago, Ill. It is on the Grand Trunk, the Indiana, Illinois and Iowa, the Lake Shore and Michigan Southern, and other railroads. The surrounding country is fertile, producing fruits and cereals. Among

SOUTH BETHLEHEM

the noteworthy buildings are the county courthouse, the city hall, the high school, the Y. M. C. A. building, the Federal building, the Oliver Hotel, the Saint Joseph's Academy, the University of Notre Dame, and the Northern Indiana Medical and Surgical Institute. The works of the Oliver Plow Company and of the Studebaker Carriage and Wagon Company are in South Bend. Among the manufactures are vehicles, farming machinery, woolen goods, sewing machines, furniture, flour, paper, machinery, hardware, tobacco products, and brick. It has a large wholesale jobbing trade. The Saint Joseph River furnishes an abundance of water power and is navigable for small craft to South Bend. place was platted in 1831 and became a city in 1865. Population, 1900, 35,999; in 1910, 53,684.

SOUTH BETHLEHEM (běth'lê-hěm), a borough of Pennsylvania, in Northampton County, on the Lehigh River, opposite Bethlehem. It is on the Lehigh Valley and the Philadelphia and Reading railroads. Among the noteworthy buildings are the Lehigh University, founded by Asa Packer in 1865. Other features include the high school, the public library, the Saint Luke's Hospital, the Bishop Throp Seminary for girls, and many churches. It has manufactures of silk, textiles, armor plate, engines and boilers, hosiery, flour, hardware, Bessemer steel products, ordnance, and machinery. South Bethlehem was founded by the Moravians in 1745. Population, 1900, 13,241; in 1910, 19,973

SOUTHBRIDGE, a town of Massachusetts, in Worcester County, on the Quinebaug River, 30 miles east of Springfield. Communication is furnished by electric railways and by the New York, New Haven and Hartford Railroad. The surrounding country produces fruits, cereals, and The features include the public vegetables. library and the Y. M. C. A. building. It has manufactures of carriages, cotton and woolen goods, boots and shoes, hats and caps, optical instruments, and machinery. The place was separated from Charleston in 1801 and incorporated in 1816. Population, 1910, 12,592.

CAROLINA SOUTH (kăr-ô-lī'nà), southern State of the United States, one of the original thirteen states, popularly called the Palmetto State. It is bounded on the north and northeast by North Carolina, southeast by the Atlantic, and southwest by Georgia. In shape it is triangular, with a base of 190 miles fronting the ocean and an apex extending inland 240 miles. A number of small bays indent the coast, including Bull's Bay, Saint Helena Sound, and Port Royal Sound. The area is 30,570 square miles, of which 400 square miles are water surface.

DESCRIPTION. The surface is divided about equally into the coastal plain along the ocean and the Piedmont plain lying inland. From the northern boundary to Winyah Bay the coast is rather low and sandy, but farther south it is higher and broken by inlets and estuaries. In

the northwest are ridges of the Blue Ridge Mountains, which rise to elevations ranging from 2,500 to 3,350 feet. Mount Pinnacle, the highest summit in the State, has an elevation of 3,336 feet above sea level. From the highlands the surface slopes gradually toward the southeast, forming the coastal plain with a width of 100 miles. This section is less than 500 feet above the sea and has a light sandy soil, forming low, marshy, and swampy regions along the coast, especially near the mouths of the rivers.

All of the drainage is toward the southeast into the Atlantic. The larger streams rise in the mountains of North Carolina, including the



1, Columbia; 2, Charleston; 3, Greenville; 4, Spartanburg; 5, Georgetown. Chief railroads indicated by dotted lines.

Great Pedee, which receives the Little Pedee and flows into the Atlantic through Winyah Bay. The Santee, formed by the Wateree and the Congaree, drains the central part of the State. It is connected by the Santee Canal with the Cooper River, which flows into Charleston harbor. The southwestern boundary is formed by the Savannah, which separates the State from Georgia. Across the Piedmont plain the streams flow rapidly, from which they pass over the fall line into the coastal plain, where they are wide and sluggish. Steamers ascend the larger streams to the fall line.

The State has a mild and healthful climate. Snow rarely falls in the interior and never on the coast, but frequently in the highlands. All sections have an abundance of precipitation, ranging from 40 to 60 inches. At Charleston the temperature is 65° and the average for the State is 61°. In January the mean temperature is 44° and in July it is 79°, while the maximum ranges from 100° in the highlands to about 106° in July. Storms sometimes sweep across the coastal plain.

The State has vast deposits of MINING. granite and limestone and considerable quantities of gold, silver, lead, copper, phosphate, and iron ore. Clay products and phosphate rock rank highest in value, the latter being used extensively in the manufacture of fertilizers. The total output of the mines and quarries is \$3,125,-000, of which about one-third is represented by granite. Coal is mined in the northwestern part of the State and mineral waters are obtained for commercial purposes in the highlands.

AGRICULTURE. About 75 per cent. of the land is included in farms, which average 90 acres, and more than half of the holdings are worked by Negroes. The soil is exceedingly fertile in the central section, and the coastal plain contains an extensive area of rice lands. Rice culture was introduced from Madagascar as early as 1693, and the quality grown is the finest in the market. Cotton is the chief product, the annual yield being about 1,150,000 bales. A large part of the product is sea-island cotton, which yields profitably along the coast, and the quality produced is of a high grade. Other products include corn, wheat, oats, potatoes, hay, tobacco, and many species of fruit, such as oranges, lemons, peaches, pears, apples, grapes, and pomegranates. Hops, flax, sorghum, and broom corn are grown quite extensively. Stock raising is a profitable enterprise. Cattle are raised both for meats and dairy products. Other live stock includes swine, horses, mules, sheep, and

MANUFACTURES. The State has grown rapidly in manufacturing enterprises since 1880. It has much water power and an abundance of raw materials. The forests yield large quantities of cypress, hickory, beech, sycamore, walnut, magnolia, and other species that are valuable for construction purposes. Cotton goods comprise the principal output, and in this manufacture the State holds first rank in the South and second in the Union. Fertilizers, flour, lumber and timber products, cotton-seed oil and cake, turpentine and rosin, pipe tobacco and cigars, clothing, and machinery are produced in large quantities. The fisheries yield material for curing and canning, such as the shad, bass, whiting, and ovsters.

COMMERCE AND TRANSPORTATION. Charleston is the principal port and is the center of a large foreign trade. However, the larger commercial interests are coastwise and inland. All of the larger streams are navigable to the fall line, such as the Pedee, the Santee, and the Savannah, and they have been improved to a considerable extent by the removal of obstructions and the construction of canals. The Southern, the Atlantic Coast Line, and the Seaboard Air Line are the principal railroads. Charleston, Columbia, Sumter, and Greenwood are the leading railroad centers. The total steam railroad lines aggregate 4,350 miles. Electric railways are operated in the cities and some of the interurban districts.

GOVERNMENT. The present constitution was adopted in 1885. It vests the chief executive authority in the governor, lieutenant governor, secretary, attorney-general, treasurer, comptroller-general, adjutant and inspector-general, and superintendent of education, all being elected by popular vote for two years. Legislative authority is vested in the Legislature, which consists

of two branches, the senate and the house of representatives. Each county is represented in the upper branch by one senator. Representation in the lower house is based upon population, the present number being 24 members. Both senators and representatives are elected by the people, the former for four and the latter for two years. Four judges, one known as the chief justice and the other three as associate justices, constitute the supreme court. They are elected for terms of eight years by the General Assembly. The State is divided into judicial districts, each having a court of general session and a court of common pleas, and the judges of these are appointed for four years by the General Assembly. Local government is exercised by townships, municipalities, and counties.

EDUCATION. The State has made noticeable advancement in education the past two decades, although more than half the population consists of Negroes. In 1900 the rate of illiteracy was 35.9 per cent. based on the total population, while among whites alone it was 13.6 per cent., and among the colored population it was 52.8 The public schools are separate for per cent. whites and Negroes, both being supported in part by a State school tax and in part by local taxation. They are under the direction of a State board of education, which has the power to appoint the county boards, and the latter boards appoint the trustees in the respective districts. High schools are maintained in the towns and cities. Normal instruction is given to teachers by the State at the Winthrop Normal and Industrial College, in Rock Hill.

The University of South Carolina, which is at the head of the public school system, consists of the Winthrop Normal and Industrial College at Rock Hill, the South Carolina College at Columbia, the Clemson Agricultural College at Calhoun, a military academy at Charleston, and departments of medicine and pharmacy at Charleston. Among the leading private institutions of higher learning are the Lutheran Newberry College, Newberry; the Allen University, Columbia; the College of South Carolina, Clinton; the Furman University, Greenville; the Classin University, Orangeburg; the Erskine College, Due West; and the College of Charleston, Charleston. The leading State institutions are located at Columbia, including the penitentiary, the orphan asylum, the hospital for the insane, and the institution for the deaf and

INHABITANTS. The number of persons to the square mile is about 45, and the foreign-born population is very small, only 5,528. Since 1820 the colored inhabitants have outnumbered the whites. Columbia, on Broad River, is the capital. Other cities include Charleston, Greenville, Spartanburg, Camden, Sumter, and Anderson. In 1900 the State had a population of 1,340,316. Of this number 782,509 were col-

ored, including 67 Chinese, 121 Indians, and

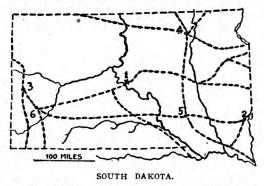
782,321 Negroes. Population, 1910, 1,515,400. History. The Spaniards first explored the coast of South Carolina in 1525 and named the region Chicora. A party of French Protestants under John Ribault made the first settlement near Beaufort in 1562, naming the place Port Royal. The colonists soon abandoned their enterprise of colonization and returned to France. The next attempt at settlement was made by a party of English under. William Sayle, who located at Port Royal in 1670, but ten years later removed to the present site of Charleston. Charles II. made a grant of the territory to colonists who attempted to set up the feudal system under a constitution called the Grand Model, but the region was divided by George IL into North and South Carolina in 1724, when the latter became a royal colony. State adopted its first constitution in 1776, when it gave vigorous support to the Revolution and was the scene of numerous internal disturbances, owing to the presence of many Tory sympathizers. Sir Henry Clinton captured Charleston and battles were fought at Eutaw Springs and Camden. The State was among the first to ratify the national Constitution, which it did on May 23, 1788, by a vote of 149 to 73. The tariff laws of 1828 caused many citizens to take part in a convention at Columbia in 1832, which nullified those laws, but the nullification ordinance was repealed after Henry Clay's compromise tariff was passed in 1833.

South Carolina seceded from the Union on Dec. 20, 1860, being the first to take the step, and on April 12, 1861, the first gun was fired on Fort Sumter. It was readmitted on June 25, 1868, having previously adopted a revised Constitution. In 1886 a severe earthquake destroyed much property in the vicinity of Charleston. The South Carolina and West Indian Exposition was held at Charleston in 1901 and 1902. Prohibition gained a wide foothold within the last decade, but a majority of the people appear to favor local option. The Legislature has adopted several measures to encourage immigration.

SOUTH CAROLINA COLLEGE, an educational institution of higher learning in Columbia, S. C., established in 1801. It was opened for instruction in 1805, but was closed for a brief time on account of the Civil War. In 1878 it was reorganized into two branches, the South Carolina College, for whites, at Columbia, and the Classin College, for Negroes, at Orangeburg. It was made coeducational in 1894. The courses include law, physics, biology, chemistry, mathematics, classics, civil and mechanical engineering, and normal instruction. With it are affiliated a number of accredited schools, from which students are admitted without examination. It has a library of 35,000 volumes, a faculty of 20 instructors, and an attendance of 225 students.

SOUTH CAROLINA EXPOSITION, an exhibition held in Charleston, S. C., known officially as the South Carolina Interstate and West Indian Exposition. It was opened on Dec. 1, 1901, and closed on June 2, 1902. Many states of the Union and a number of foreign countries were represented by buildings or exhibits. The purpose was to demonstrate the industrial progress and commercial possibilities of the South and the countries of Central America, South America, and the West Indies. It was officially reported that 675,000 persons attended.

SOUTH DAKOTA (da-ko'ta), a northwestern State of the United States, popularly called the Covote State. It is bounded on the



Pierre: 2, Sioux Falls: 3, Lead: 4, Aberdeen: 5, Mitchell: 6, Rapid City. Chief railroads indicated by dutted lines

north by North Dakota, east by Minnesota and Iowa, south by Nebraska, and west by Wyoming and Montana. The length from east to west is 370 miles and the breadth is 223 miles. A part of the southern boundary is formed by the Missouri River, which separates the southeastern part from Nebraska. The Big Sioux River forms a part of the boundary between it and Iowa. It is separated from Minnesota partly by Lake Traverse, the Minnesota River, and Big Stone Lake. The area is 77,650 square miles, which includes 800 square miles of water surface.

DESCRIPTION. The general slope of the eastern part is toward the south, the western inclines toward the east, and through the central part extends the low depression of the Missouri River, which slopes toward the south. All of the State lies within the region of the Great Plains. The elevations range from 1,350 feet in the southeast to 3,000 feet in the west. A narrow belt along the shore of Lake Traverse is less than 1,000 feet, while Harney Peak, the culminating summit of the Black Hills, has an altitude of 7,216 feet. The surface of the eastern part is a gently undulating plain, the region west of the Missouri is considerably diversified by ranges of hills, and in the western part are the Black Hills. These mountains lie on the boundary between South Dakota and Wyoming,

extending into the State about 100 miles. In the southwestern part are the so-called Bad Lands, which consist of denuded bluffs and hills, through which deep ravines have been cut by the action of streams. The plateau known as the Coteau du Missouri extends into the State from North Dakota and forms an elevated region between the Missouri and the James rivers. Another plateau, known as the Coteau des Prairies, extends into the State from Minnesota and occupies the region lying in the northeastern part, between the James River and the Minnesota boundary. The eastern half of the State is generally fertile, interspersed in localities by sandy tracts, but the character of the soil west of the Missouri is greatly diversified. Here many buttes and irregular ridges characterize the surface, but large tracts and the valleys are fertile, and fine grazing lands abound even in the most arid regions.

All of the drainage belongs to the Missouri, which traverses the State from the central part of the northern boundary to the southeastern corner. It has a comparatively narrow valley, from which bluffs rise from 150 to 300 feet, merging into the level plains beyond. From the west it receives the inflow from the White, Big Cheyenne, Moreau, and Grand rivers, but the volume carried by these streams is comparatively small in consideration of the large areas Irained. The Keya Paha River crosses the boundary into Nebraska and joins the Niobrara. The eastern part is drained principally by the James River, or Dakota River, which enters the State from North Dakota and discharges into the Missouri a short distance below Yankton. East of it is the Vermilion River and on the Iowa border is the Big Sioux, Numerous small lakes of glacial origin are in the eastern part, of which Big Stone and Traverse, on the Minnesota border, are the most important. A ridge separates Lake Traverse from the Minnesota River, hence this lake and a small tract

of the Red River of the North. South Dakota has a singularly healthful and invigorating climate and is noted for its large number of bright days. The extremes are quite marked, ranging from 40° below zero in the higher altitudes during the winter to 108° in summer. In January the mean temperature is 15° and in July it is 73°. Blizzards laden with fine floating snow blow across the State in winter, but the snowfall is not heavy. rainfall ranges from 20 to 30 inches in the eastern part to 15 to 20 inches in the west, where irrigation is employed to some extent. The summers are pleasant, the nights are cool, and the autumns are particularly beautiful. The State is largely a treeless prairie country, but forests are found along the streams and in the Black Hills, and many tracts of timber have been planted. Among the forest trees are the elm, ash, maple, cottonwood, and box elder, in

in the northeast corner are located in the valley

the valleys, and the Black Hills region has a good growth of pine and cedar.

MINING. The mineral wealth is confined chiefly to the Black Hills, where gold, silver, copper, nickel, manganese, and graphite are found. Gold is the principal product from the mines and represents a value of \$6,750,000 out of a total of \$8,125,000. Lignite coal occurs in veins of considerable extent in the northwestern part of the State, but the output is not sufficient to supply the demand for local consumption. Clays of commercial value are abundant, suitable for the manufacture of brick and pottery. Limestone, granite, and sandstone are quarried for building and other economical purposes. Mineral waters are found in the Black Hills, especially at Hot Springs, which is noted as a health resort, owing to its thermal and richly laden mineral waters.

AGRICULTURE. Though irrigation must be resorted to in some sections of the State, agriculture is the leading industry. The eastern part has ample rainfall for all classes of farming, while the irrigated region is confined to the western section, where the water is drawn from the White and the Cheyenne rivers and their tributaries. About 50 per cent. of the area is included in farms, which average 362 acres, and only 20 per cent. is rented. Wheat is grown on a larger acreage than any other cereal and a comparatively large extent is devoted to the growth of hay and forage. The cultivation of corn, though most extensive in the eastern part, has grown in favor very rapidly. Other crops grown extensively include barley, oats, rye, flaxseed, potatoes, garden vegetables, and fruits, including chiefly apples, plums, and cherries. Large areas, especially in the west, are devoted to grazing, but the larger ranches are fast giving way to mixed farming. The State has extensive interests in growing cattle, both for meat and dairying, and the breeds are generally of a high order, such as Shorthorn, Holstein, and Hereford. Large numbers of horses, swine, and sheep are exported. Large interests are vested in growing mules and poultry.

Considerable progress has MANUFACTURES. been made the past decade in the output of manufactures, which consist largely of products obtained from raw materials of the farm and mines. Flour is produced in large quantities and this is true likewise of butter, cheese, and condensed milk. Large interests are vested in printing and publishing, notably at Sioux Falls and Aberdeen. Other products include Port-land cement, cured and packed meats, clothing, earthenware, brick, and farming machinery.

COMMERCE AND TRANSPORTATION. Large quantities of cereals, minerals, and live stock are The tendency is to increase manuexported. facturing within the State, with the view of employing labor and building up the wealth of local communities. Textiles and farming machinery are imported extensively. Although the Missouri is navigable in its entire course through the State, it is not used extensively for that purpose. Railroad building has received marked attention since 1880, and at present the State has 4,250 miles in operation. Two lines cross the State from east to west, those of the Chicago and Northwestern and the Chicago, Milwaukee and Saint Paul. Both these companies have lines crossing the eastern part of the State from north to south, while the transcontinental line of the latter crosses the northeastern part and enters North Dakota on the west side of the Missouri. Other lines within the State are the Great Northern, the Illinois Central, the Chicago, Rock Island and Pacific, the Minneapolis and Saint Louis, and the Chicago, Burlington and Quincy. Many highways have been improved by grading and the building of bridges.

GOVERNMENT. The constitution was adopted when the State was admitted into the Union, in 1889. It vests the chief executive power in the governor, lieutenant governor, secretary of State, auditor, treasurer, attorney-general, commissioner of schools and public lands, and superintendent of public instruction, all elected for two Five judges constitute the supreme court, all elected for four years. The State is divided into judicial districts, each presided over by a judge elected for four years. For the purpose of local government the State is divided into counties, which are again divided into town-Local government is administered ships. through the township, municipal, and county authorities.

EDUCATION. The State takes high rank intellectually, only 5 per cent. of the people over ten years of age being illiterate. A State superintendent of public instruction, elected by the voters, has general supervision of the schools, but he is aided by city and county superintend-The towns and cities maintain high schools by local taxation, based upon both personal and real property, and the common schools are supported by State and local aid. Aberdeen, Madison, Spearfish, and Springfield have normal schools The State University, situated at Vermilion, is at the head of the system of education. Other State institutions include an agricultural college at Brooking and a school of mines at Rapid City. Among the leading denominational and private schools are the Lutheran Augustana College, Sioux Falls; the Dakota University, Mitchell; the Huron College, Huron; the Redfield College, Redfield; the Yankton College, Yankton; and the Black Hills College, Hot Springs.

Yankton is the seat of the State insane asylum, Hot Springs has a soldiers' home, and Gary contains an institution for the blind. The reform school is located at Plankinton and the State prison is at Sioux Falls. Canton has an ayslum for insane Indians.

INHABITANTS. The State has grown rapidly in population, owing largely to its extensive region of fertile lands open for settlement or sale under favorable conditions. About onefifth of the inhabitants are of foreign birth, including principally Germans, Swedes, and Rus-The Lutherans are the strongest religious denomination. Pierre, on the Missouri, is the capital. Other cities include Sioux Falls, Lead City, Yankton, Aberdeen, Mitchell, Deadwood, and Watertown. In 1900 the population was 401,570. This number included a total colored population of 20,856, of which 465 were Negroes and 20,225 Indians. Population, 1907,

472,734; in 1910, 583,888.

HISTORY. South Dakota was acquired as a part of the Louisiana Purchase in 1803, but was under British rule prior to the settlement of the boundary between the United States and Canada. The Lewis and Clark expedition ascended the Missouri in 1804-06, and soon after fur trading posts were established. A treaty with the Dakota Indians opened the region to settlers in 1851. The first permanent settlement was made at Sioux Falls in 1857. In 1861 the two Dakotas were organized as the Territory of Dakota with the capital at Yankton, but the seat of government was removed to Bismarck in 1883. A division was made in 1889, when South Dakota was admitted as a State into the Union, and Pierre became the capital. The divorce laws were more liberal than in any other State from the beginning, but they were somewhat altered in 1908.

SOUTH DAKOTA, University of, an educational institution at Vermilion, S. D., organized on a coeducational basis in 1882. It was established as a territorial institution under the name of the University of Dakota, but its name was changed when the Territory was divided into North and South Dakota. As an endowment it received 86,000 acres of public land, which has been sold or leased as a means of support. Courses are maintained in law, music, commerce, collegiate branches, civil and mechanical engineering, classics, literature, military science and tactics, and geological surveying. The property of the University has a value of \$375,000. It has a library of about 35,000 volumes. The faculty includes 60 professors and instructors, and there is an average attendance of about 800 students.

SOUTHERN CROSS, an interesting group of stars in the Southern Hemisphere, including four stars of the first magnitude. Good views of it may be taken at the Tropic of Cancer, but its aspect is considerably better farther south. The four principal stars form a cross, two of them pointing directly east and west, while the upper and lower ones point to the South Pole. The Southern Cross is a less striking configuration than the Great Bear, but it is equally interesting from the circumstance that in the different seasons of the year the hour of the night is indicated by the position it as-

SOUTHEY (south'i), Robert, poet and miscellaneous writer, born in Bristol, England, Aug. 12, 1774; died March 21, 1843. He was the son of a draper and, after attending several private schools, entered Oxford University. It was at first intended that he should take orders for the church, but, coming in contact with Coleridge, he departed from the orthodox standards, and in 1792 was dismissed for writing a paper on school punishments, which he had published in The Flagellant. Subsequently he was readmitted and remained at Oxford until 1794, and soon after published a small volume of poems. Afterward he devoted himself wholly to literature and, after he and Coleridge married sisters, settled in a country home near Keswick. By his prolific pen he was able not only to support his own family, but to assist in supporting the household of Coleridge. His library was enlarged to 14,000 volumes, and he devoted himself to reading and writing with almost mechanical regularity.

Southey was made poet laureate in 1813, but shortly after refused a baronetcy, though in 1835 he accepted a government pension of \$1,500 annually. His general writings include 109 volumes, but besides these he contributed 52 articles to the Annual Review, three to the Foreign Quarterly, and 94 to the Quarterly. The poetic writings of Southey contain many exaggerations and some of the scenes are unreal, but his prose is remarkable for evidence of thorough research and an excellent style. The principal works in prose embrace "Life of Nelson," "Lives of British Admirals," "History of the Peninsular War," "History of Brazil," "Book of the Church," and "Life of Wesley." Among his poetic works are "Joan of Arc," a juvenile production, "The Curse of Kehama," "Roderick, the Last of the Goths," "Battle of Blenheim," and "How the Water Comes Down at Lodore."

SOUTH HADLEY (had'li), a town of Massachusetts, in Hampshire County, three miles northeast of Holyoke. It is on the Connecticut River, which has a fall of forty feet at this place, and is near the Boston and Maine and other railroads. Electric lighting, sewerage, and a public library are among the utilities. It is noted as the seat of Mount Holyoke College, the oldest collegiate institution for women in the United States. The manufactures include brick, fertilizers, cotton and woolen textiles, and lumber products. Population, 1910, 4,894

SOUTH McALESTER (măk-ăl'īs-ter), a city of Oklahoma, in the Choctaw Nation, 85 miles southwest of Fort Smith, Ark. It has transportation facilities by the Missouri, Kansas and Texas and the Chicago, Rock Island and Pacific railroads. Electric railways extend to a number of points in the eastern part of the State. The surrounding country produces large quantities of cotton, fruit, and bituminous coal. Among the manufactures are coke, brick, flour, cigars, and machinery. It has a public library, a number of fine schools and churches, and many substantial business blocks. Electric lighting, sewerage, and telephones are among the utilities. Population, 1910, 4,250.

SOUTH MILWAUKEE (mil-wa'ke), a city of Wisconsin, in Milwaukee County, ten miles south of Milwaukee, on the Chicago and Northwestern Railway. It has manufactures of steam dredges, hardware, clothing, and machinery. The chief buildings include several public schools, a number of churches, and numerous business houses. Electric lighting and waterworks are among the public utilities. Population, 1905, 5,284; in 1910, 6,029.

SOUTH MOUNTAIN, Battle of, an en-

gagement of the Civil War in the United States, fought at South Mountain, near Sharpsburg, Md., on Sept. 14, 1862. General Lee had invaded Maryland with a large army and was stationed near Turner's Gap with 18,000 men, where he was attacked by 28,000 Federals from McClellan's Army of the Potomac. After a stubborn resistance, the Confederates were compelled to retreat, losing 2,600 men, while the Federals lost 1,800. They fell back to Antietam (q. v.), where another battle was fought two days later.

SOUTH NORWALK (nôr'wak), a city of Connecticut, in Fairfield County, fourteen miles southwest of Bridgeport. It is located at the mouth of the Norfolk River, on Long Island Sound, and has communication by the New York, New Haven and Hartford Railway. The site is on elevated ground overlooking the sound, hence its location is both pleasant and healthful. The harbor is extensive and carries a large coastwise trade. Clothing, boots and shoes, hardware, and machinery are among the leading manufactures. It has waterworks, electric lighting, and a public library. Oyster fishing and shipbuilding are carried on extensively. It was chartered as a city in 1870. Population, 1900, 6,591; in 1910, 8,968.

SOUTH OMAHA (ô'mà-ha), a city of Nebraska, in Douglas County, situated immediately south of Omaha, on the Union Pacific, the Chicago, Rock Island and Pacific, the Chicago, Burlington and Quincy, and the Missouri Pacific railroads. Communication within the city and with Omaha is maintained by electric railways. The noteworthy buildings include the high school, the public library, the city hall, and many churches. It is particularly noted on account of its extensive stock yards, meat-packing houses, rendering tanks, and trade in cured The hog-slaughtering industry takes meats. third rank in the United States. It has systems of sewerage, waterworks, and electric and gas lighting. South Omaha has had a remarkable growth the past decade. It ranks as the third city in the State, being exceeded only by Omaha and Lincoln. The place was settled in 1882

and annexed to Omaha in 1915. Population. 1900, 26,002; in 1910, 26,259.

SOUTH ORANGE, a village of New Jersey, in Essex County, fifteen miles west of New York City. It is on the Delaware, Lackawanna and Western Railroad and has connections by electric lines with other points in the State. The site is on elevated ground facing Orange Mountain, hence it is popular as a residential center for Newark and New York business men. Among the features are Seton Hall College, the public library, the townhall, and several fine schools. It has a large local trade and manufactures of clothing and machinery. The first settlement was made in 1670. Population, 1905, 4,932; in 1910, 6,014.

SOUTH POLAR EXPLORATIONS. See

Polar Expeditions.

SOUTHPORT (south'port), a borough of England, in Lancashire, eighteen miles north of Liverpool. It is situated at the mouth of the Ribble Estuary, on the Irish Sea, and is popular as a watering place. Besides many public buildings and institutions, it has an art gallery, a public library, and winter gardens. The manufactures include clothing, earthenware, and machinery. Electric street railways, gas and electric lighting, waterworks, and pavements are among the public improvements. The place was first platted in 1830. Population, 1911, 51,650.

SOUTH PORTLAND (port'land), a city of Maine, in Cumberland County, on Casco Bay, opposite Portland. It is connected with Portland by four bridges and electric railways and has communication by the Boston and Maine Railroad. The manufactures include hardware, sailing vessels, and clothing. It is the seat of a State school for boys, has a fine soldiers' monument, and is protected by government fortifications. Formerly it was a part of Cape Elizabeth, but was organized as South

Portland in 1895. Population, 1910, 7,471. SOUTH SEA SCHEME (skem), a plan originated by Robert Harley, Earl of Oxford, in 1711, with the view of securing the payment of the debt of England, which at that time aggregated \$50,000,000. An amount equal to the debt was loaned to the government by a number of merchants, who were guaranteed an annual payment of 6 per cent. interest. They were given a monopoly of the South Sea trade and the right to collect certain customs. The popular idea that enormous riches could be obtained in South America caused the stock to rise with remarkable rapidity until it reached \$5,000, but a collapse came when certain stockholders transferred their interest to others. It was found that fictitious stock to the amount of \$6,300,000 had been authorized, of which about one-half had been sold. To reimburse the heavy losers the government confiscated the property of the directors and remitted an amount equal to \$35,000,000 due the government. Though this course provided a small measure of relief, it did not by any means repay those who had been induced by glowing promises to invest their money

SOUTH SHIELDS. See Shields, South. SOVEREIGN (suv'er-in), a gold coin of Great Britain, the standard of value, representing the pound sterling. It is equivalent to twenty shillings, or about \$4.86, and was first coined in 1817, when it began to supersede the guinea. The sovereign weighs 123.274 grains troy. See Pound.

SOVEREIGNTY, in government, the state of being sovereign, that is, having independent and supreme authority. The term is used in two different senses in relation to the power of a state or nation, these implying that internal as well as external sovereignty may be exercised. By internal sovereignty is meant the power of the state over its citizens, which is absolute and indivisible, that is, the state cannot be limited, except by its constitutions and laws, in exercising prerogatives over its citizens; and its authority cannot be divided so as to permit one or more other sovereigns to exercise the functions of government over its members. External sovereignty has reference to affairs with other nations, such as concluding treaties, declaring war, negotiating peace, and exercising powers relating to its internal affairs. While a sovereign state is absolutely independent in theory, it is more or less dependent in fact, since no political state can exist without taking cognizance of other nations.

SOWING MACHINE (sō'ing ma-shēn'), an implement for sowing the seed of grasses and cereals, such as are grown by agriculturists and gardeners. In the early stages of farming the seed was scattered by means of the hand, the sower carrying a supply of seed in a bag or box suspended from the shoulder. Subsequently devices were placed on the market that enabled the sower to scatter the seed by carrying a mechanical device, but this was soon superseded by machines mounted on wheels to be drawn by horses. Still later implements were manufactured that scattered the seed and at the same time cultivated the soil, small steel shovels being attached beneath the box for that They are of two kinds, known as purpose. drill and broadcast seeders. The former sow the seeds in rows, while the latter scatter them uniformly.

A machine with a funnel to hold the grain, having a disc operated by means of a chain connected with the wheel of a cart, has come into wide use. Most of the farmers who cultivate large fields attach a device of this kind to the box of a common wagon, the propelling force being supplied by a rim attached to one of the hind wheels. The seed to be sown is placed in the wagon and the operator places the grain in the funnel as required, while the driver at the front end of the wagon attends to the team so a uniform speed may be maintained in moving across the field. Machines of this kind are usually called broadcast seeders. By means of a single machine twenty to thirty acres may be sown in a single day, though a moderately high wind interferes with the uniformity in scattering the seeds, this depending somewhat upon

the character of the grain sown.

SOW THISTLE, a genus of plants native to the Eastern Hemisphere, of which about thirty species have been described. The common sow thistle is two or three feet high, bears small yellow flowers, and is a branching plant. Another species is known as the field sow thistle, which is an obnoxious weed in richly cultivated land. Several of these plants have been brought to Canada and the United States with shipments of seeds, and have developed into injurious plants, similar to the Canada thistle.

SPAHIS (spä'hēz), the name applied in Algeria to a class of cavalry, consisting of natives. It was organized to supersede the regular cavalry in 1796, and has been maintained since the French conquered that country. Cavalrymen belonging to the spahis carry such weapons as the javelin, lance, and saber. The uniform is similar to that of the Arabs. In British India the name sepoys has reference to a similar class

of native troops.

SPAIN (spān), a kingdom in the southwestern part of Europe, occupying about sixsevenths of the Iberian peninsula. It is bounded on the north by the Bay of Biscay and France, east by the Mediterranean, south by the Mediterranean, the Strait of Gibraltar, and the Atlantic, and west by Portugal and the Atlantic Ocean. From France it is separated by the Pyrenees and from Africa, by the Strait of Gibraltar. The greatest extent from east to west is in the northern part, where it is 620 miles, and its extent from north to south is 540 miles. The coast line is quite regular, having no large indentations, but it has an extent of 3,120 miles. Spain proper includes the Balearic Islands, in the Mediterranean, and a tract of land on the coast of Africa with an area of thirteen square miles. The total area is 194,783 square miles, and the portion on the continent of Europe has 192,004 square miles.

DESCRIPTION. The surface is greatly diversified by mountains, tablelands, and valleys. The interior has a general altitude of from 1,000 to 3,000 feet above the sea, much of which is a treeless plateau sloping toward the west. Among the principal mountain chains are the Cantabrian and the Pyrenees, in the north; the Sierra de Gredos, the Sierra de Gaudarrama, and the Montes de Toledo, in the central part; and the Sierra Morena and the Sierra Nevada, in the southern part. The highest mountains belong to the Pyrenees, which in Spain include Pico de Aneto, 11,160 feet, but the highest peak in Spain is Mulahacen, 11,420 feet, in the Sierra Nevada. This peak is the loftiest summit of Europe outside of the Alps. Other mountain heights range from 5,275 to 8,500 feet, the latter being the elevations in the Cantabrian Mountains. Between many of the mountain ranges are deep and narrow valleys, which are drained by rapid streams, and many of the ranges are very difficult to traverse.

The drainage is chiefly toward the west, but some of the important rivers flow eastward into the Mediterranean. No streams flow directly north, owing to the fact that the Cantabrian Mountains form a watershed near the Bay of Biscay. The principal rivers flowing into the Mediterranean are the Ebro, the Júcar, and the Segura. The Guadalquiver flows southwest and discharges into the Atlantic. The Guadiana, the Tagus, and the Douro rise in Spain and flow through Portugal into the Atlantic, while the Minho forms part of the boundary with Portugal and discharges into the Atlantic on the northern frontier of that country. About 800 miles of the waterways are navigable, but only 300 miles can be used the entire year, owing to the marked effect of the dry season. Guadalquiver, which is navigable to Seville, is the most important navigable stream. Spain has many small lakes, including Lake Albufera, but they are not important.

The climate is greatly diversified, owing to extensive variations in the altitude, and there are marked differences in the annual rainfall of the coast and interior sections. It may be said that the southern part has a semi-tropical climate, while the interior has warm summers and cold winters. In summer the temperature rises so high in the tableland that the earth becomes parched and nearly all of the rivers dry up, and in the winter this section is marked by a low temperature. In the center of the country, at Madrid, the mean temperature is & , but frost and snow are rare, and the summer heat frequently rises to 107°. Rainfall in the interior ranges from eight to fifteen inches per annum, but in the coast regions there is a much larger precipitation. Dry winds frequently blow from the Sahara of Africa in the summer. In the winter a cold wind, called the

Gallego, blows from the north.

MINING. The mineral deposits of Spain are extensive and diversified. Coal is found in nearly all sections of the country, but is produced chiefly in León, Asturias, and Lérida. Almaden has the richest quicksilver mines in the world. In the output of lead it excels any other country of Europe and it has inexhaustible deposits of copper, but the latter are worked chiefly by German and British capital. Extensive salt-evaporating works are maintained at Valencia and in the Balearic Islands, and rock salt deposits abound in Catalonia and New Castile. Other minerals include zinc, manganese, antimony, gold, iron, and silver.

AGRICULTURE. The soil is singularly fertile, even in the hilly sections, but irrigation is the

basis of agriculture in most parts of the country Farming has attained its highest development among the Basques and Catalonians. About four-fifths of the area is productive, either as grazing or farming lands, and irrigation is extending the tillable surface. About one-third of the tilled surface is under fields and gardens and the remainder is devoted to growing grasses, orchards, and vineyards. Wheat is the leading cereal. Other important crops include rye, barley, maize, rice, oats, and potatoes. The food cereals are not grown in sufficient quantities to supply the demand, hence many of the foodstuffs are imported. Spain is celebrated for the fine-fleeced merino sheep and in proportion to population it has a greater number of this class of animals than any other country of Europe. Goats are raised extensively for their flesh, milk, and skins, and some of the larger estates have as many as 3,500 of these animals. Horses of Arab stock are reared to some extent, but the mule is a more popular and numerous animal in Spain than the horse. Cattle are grown both for meat and dairying and special breeds for bullfighting are maintained. Other domestic animals include swine and poultry.

Extensive interests are vested in the southern part in growing the cork oak. The vine industry is one of wide extent, producing large quantities of grapes that are used in the manufacture of high grades of wine. Fruits of all kinds grow in abundance, especially olives, oranges, lemons, and apples, and large quantities are dried and canned. The culture of the mulberry tree and the silkworm receives marked attention, and in the production of raw silk Spain takes a high rank. Other products include cot-ton, sugar cane, rice, licorice, saffron, and Though the forests have been vegetables. cleared largely to obtain agricultural land, considerable oak, chestnut, willow, beech, and poplar timber still abounds.

MANUFACTURES. At present the home demand cannot be supplied by the output of manufactures, but they are extending noticeably under encouragement by the government. Catalonia, of which Barcelona is the leading city, has greater developments in manufacturing than any other province. Here are extensive establishments for the manufacture of silk, cotton, and woolen textiles. Large interests are vested in the manufacture of leather at Cordova and the royal factories of Madrid, Seville, and Valencia have a large output of pipe tobacco and cigars. Extensive steel and iron works are maintained and efforts are being made to supply the entire home demand. The fisheries yield large quantities of cod, tunny, and sardines, much of the output being cured and canned, but the home industry does not supply the demand. Other manufactures include beet sugar, olive oil, glassware, boots and shoes, porcelain, cutlery, hardware, and machinery. Water power is utilized extensively in the manufacturing enter-

COMMERCE. Although Spain has a large foreign trade, it exports raw materials and imports manufactured articles. Fruits, wine, and minerals are the chief exports. The principal imports include lumber, cotton textiles, and machinery. Great Britain, France, the United States, and Germany have the largest share of trade in the order named. The imports exceed

the exports.

TRANSPORTATION. Many of the highways have been improved, but they do not compare favorably with those of France and Germany. About 10,125 miles of railways are in operation, all owned by private corporations. Electric railways are operated in the cities, whence they extend to some of the interior towns. A large share of the domestic trade is carried by coasting vessels and through canals. Telephone and telegraph systems are utilized extensively, the

latter including 23,500 miles.

GOVERNMENT. Spain is a constitutional monarchy, the present constitution dating from 1876. It is hereditary, giving precedence to the male line of equal right. Executive power is vested in the sovereign, who has legislative functions in connection with the Cortes, the lawmaking authority. The king is assisted by a council of nine ministers, such as the ministers of foreign affairs, interior, finance, agriculture, instruction, etc. Two houses constitute the Cortes, namely, the senate and the chamber of deputies. Members in the former hold office partly by inheritance and partly by election, and in the latter they are chosen partly by popular vote. At present there are 80 who hold office by right of birth; 100, by appointment of the crown for life; and 180, by general election for five years, making a total of 360 in the senate. On the other hand, there are 406 deputies elected for five years in the chamber of deputies. In 1890 the constitution was amended to extend the right of suffrage to all male Spaniards who are 25 years of age, but a nominal property qualification maintains.

The supreme court of cessation is the highest judicial tribunal. Subordinate to it are the district courts, from which causes may be appealed to the supreme court. Local judicial authority is vested in the municipal courts and those of justices of the peace, whose decisions are subject to review by the higher courts. Each province has its own assembly, chosen by popular vote, and is subdivided into communes for the purpose of local government. Spain has a standing army of 80,000 men, but in addition there is an active military reserve. The navy is not strong when compared to the naval equipment of other countries of Europe. At present the fleet includes twelve armored vessels of large size, several protected cruisers, and a number of gunboats. The peseta is the common monetary unit, having a value of about twenty cents in the money of Canada and the United States.

EDUCATION. Though education was formerly neglected, a better era has set in and schools are regularly inspected. A compulsory educational law was passed in 1857, requiring attendance upon elementary schools, but it has not been enforced with any degree of strictness. The rate of illiteracy is placed at 60 per cent., but it is thought that the amended compulsory law of 1902 will tend to greatly improve conditions within the next decade. Spain was unfortunately involved in colonial and foreign wars the latter part of the last century, by which the home government was deprived of many of its young men and the finances needed to promote domestic development. However, the country has entered upon a state of industrial, educational, and governmental transition that gives

evidence of greater prosperity.

The Roman Catholic is the national church, but a restricted form of liberty of worship is extended to Protestants. Spain is the most Catholic country in the world. The number of non-Catholic church members may be placed at 50,000. The Catholic Church in Spain has nine archbishoprics and is divided into fifty-four dioceses. Ten universities are maintained, including those at Saragossa, Santiago, Valentia, Seville, Valladolid, Barcelona, Granada, Oviedo, Salamanca, and Madrid. The University of Madrid was founded in 1836 and is now the best equipped and attended educational institution of Spain, while that of Salamanca, greatly renowned in the Middle Ages, is at present in least repute. The government maintains schools of agriculture, engineering, commerce, fine arts, mining, and music. Besides those supported as public institutions are many private and parochial educational enterprises.

COLONIES. The colonial possessions of Spain are at present confined to Africa. They include Rio de Oro and Adrar, Bata and Cape San The total area of Juan, and Fernando Póo. these possessions is 252,850 square miles, but all are sparsely populated, containing not more than 124,500 inhabitants. To these are added the Canary Islands, located about 70 miles from the northwestern coast of Africa. The colony of Rio de Oro and Adrar, on the western coast of Africa, is governed by the executive of the

Canary Islands.

INHABITANTS. The density of population is about 97 to the square mile. Many of the inhabitants have emigrated to Spanish-America, and there is still considerable emigration to Argentina, Brazil, and Uruguay. Madrid is the capital and largest city. Other cities of importance include Barcelona, Valencia, Seville, Málaga, Murcia, Cartagena, Saragossa, Granada, and Cadiz. Population, 1910, 19,503,068.

LANGUAGE AND LITERATURE. Spanish is a Romance language. It sprang from the Latin, introduced into Spain with Roman dominion.

Spanish is spoken by the people of Mexico and parts of Central and South America. The language embraces a number of different dialects, but the Castilian branch is the classic and literary form. It may be considered one of the most beautiful of European tongues and is distinguished from the Portuguese by its deep and open tones. It has twenty-seven letters and as many distinct sounds, of which six are classed as vowels.

The first writings in Spanish literature are the "Poems of the Cid," dating from the 12th century. These include a number of songs and ballads dedicated to national heroes, principally recounting the adventures of Rodrigo Diaz de The Benedictine monk, Gonzalo de Bivar. Berceo (1198-1268), published a number of didactic verses of great beauty, and soon after appeared ballads and romances of chivalry. Alfonso X. stimulated literature by encouraging writers, and in 1265 caused the publication of a Castilian code of laws known as "Las Siete Partidas." Juan Ruiz is a famous poet of the 14th century and a contemporary of Pedro Lopaz de Ayala (1332-1406), who published a number of fables, pastoral hymns, and patriotic songs and made a version of the "Dance of Death." Many of the ballads and traditions were handed from generation to generation up to the 16th century, when the second period of Spanish literature begins. This epoch marks the development of lyric poetry alongside the didactic, receiving impetus from Provençal poets who settled at the court of Barcelona. The most noted production in that century is the "Amadis de Gaula," a large work devoted to romantic chivalry.

The period from the 16th to the 18th century is the most splendid and productive in Spanish literature. Charles V. was a patron of learning. In his reign many German scholars were retained in the Spanish universities, and under him Spain became the foremost state in Europe. The conquest of Naples caused Spanish writers to study Dante, Petrarch, and other great Italian masters, thus leading to numerous translations and original works. Miguel Cervantes wrote his famous "Don Quixote" in 1605, which was received with great favor and presented in a dramatized form throughout the 17th century. Lope de Vega (1562-1635) is one of the eminent Spanish dramatists in this golden period The historians include Juan de of literature. Mariana and Diego de Mendoza and there are equally prominent writers in theology, law, science, astronomy, and geography. Spanish literature was influenced by the French at the accession of the Bourbons, and it has been extended by writers in Mexico and South American countries. The 19th century marks a period of decline in the literature of Spain, but the enactment of laws to encourage education and industrial arts is stimulating scholarship and enterprise. As a result the 20th century

promises a new epoch in its literature and the addition of many works of educational value.

HISTORY. The region occupied by Spain and Portugal was inhabited in ancient times by the Iberians, who were afterward joined by Celtic tribes. Phoenician settlements were made along the Mediterranean coast as early as 1100 B. C., when Cadiz was founded, and the Greeks soon after established several colonies. Spain was known to the ancient Greeks as Iberia, the name being applied in the writings of Herodotus in connection with the Phoenicians. thaginian invasions occurred about the middle of the 3d century. These people established a considerable commerce, but under Hamilcar Barca they subjected a large part of the peninsula to Carthage. Subsequently incursions were made under Hasdrubal and Hannibal, who greatly extended the Carthaginian influence, but soon after war began with Rome, finally resulting in the Carthaginians being expelled from Spain in 205 B. C.

The Romans generally applied the name of Hispania to the region, dividing the country into the northern and southern divisions, but many prolonged wars resulted before the country was finally conquered. Augustus Caesar completed the conquest in 19 B. C. Soon after the Latin language and customs were adopted and the Christian religion superseded the hero and idol worship of the Carthaginians. With the decline of Rome came successive invasions from the west and north. The Franks made a great invasion in 256 A. D., but the country continued to prosper until the early part of the 5th century, when a tide of Vandals and Alani swept over Spain, destroying many of its finest cities and carrying away its treasures.

The Visigoths established a kingdom in 418, which brought a return of general prosperity that endured until 711, when it was conquered by Arabs and Moors under Tarik, who defeated the native army at Jerez de la Frontera in July of that year. At first the government was administered by the caliphs of Bagdad and later by the caliphs of Damascus, but dissensions ultimately caused the establishment of an independent dynasty under Abd al-Rahman in 756, known as the Ommiyade dynasty, with the seat of government at Cordova. In that period the Moorish kingdom reached its greatest grandeur and Cordova became the finest city in Western Europe. Mosques and other forms of architecture were erected in the different cities. Many of the finest buildings of Moorish construction are still to be seen in different parts of Spain.

Small kingdoms began to form in various parts of Spain by the uniting of descendants from the Visigoths and early Iberians. Among the states were Aragon, León, Castile, Asturias, and Navarre, and wars for supremacy became frequent, but all united as a common enemy against the Moors. With the extinction of the Ommiyade dynasty in 1131, Mohammedan power

began to decline and the two Christian states of Aragon and Castile rose rapidly. A decisive battle at Las Navas de Tolosa, in the Sierra Morena, in 1212, so reduced the Moslem influence that they retained only Granada and Cordova and from that time the Moorish influence declined rapidly. With the marriage of Isabella of Castile to Ferdinand of Aragon, in 1469, the crown of the two kingdoms became united and with this union begins the history of modern Spain. Each of the two states retained its own customs and laws, but there was a gradual fusion of the two governments, and in 1476 the Holy Brotherhood was formed to enlarge the powers of the central government by curtailing the power of the nobles. The Inquisition was founded in 1481 with the view of extending religious orthodoxy and unity. The Jews were expelled soon after and in 1492 Moorish dominion ended by the conquest of Granada. In the latter year Columbus discovered America. That noted event not only aided the country commercially, but the military power of Spain received its first great impetus, both in America and Europe. On the death of Ferdinand, in 1516, his daughter Joanna ascended the throne. She had married Philip, son of Maximilian I. of Germany, but was soon succeeded by her son, Charles I.

Charles was not only King of Spain, but also of the Netherlands, which came to him as an inheritance from his father, and in 1519 he succeeded to the throne of Germany as Emperor Charles V. He was a rigid Catholic, and his religious zeal caused him to declare war against the Turks and the Protestants of Germany and France, a course that proved a heavy tax upon the resources of his dominion. However, the addition of extensive territory to Spain enabled him to enlarge the navy and bear the burdens of long conflicts of arms. Among the most notable events of his reign are the conquest of Mexico in 1518 and of Peru in 1531, and the annexation of the Milanese and large regions in Northern Africa. He resigned all his dignities in 1556 to his son, Philip II., who gave Spain a successful internal administration, but exercised with great freeness the Inquisition and political and religious despotism. In 1580 Portugal was united to Spain, but his foreign policy was highly disastrous, losing a large part of the Netherlands and the Invincible Armada, as the Spanish fleet was called, and consequently the country declined in prestige as a great naval power. Philip III., his son, succeeded him in 1599, in whose reign the Moors were cruelly oppressed and the Moslem faith was extinguished, and in 1609 an edict was issued that all the Moriscos were required to depart from Spain under penalty of death.

The Moors had introduced the cultivation of silk, cotton, tobacco, and rice in Spain and had established systematic irrigation, founded schools, and developed agriculture to a high de-

gree of perfection. They represented the most successful industrial class and their expulsion proved highly disastrous to Spain. From that blow the Iberian peninsula never recovered and Spanish influence suffered still further by the Thirty Years' War. Philip IV. ascended the throne in 1621 and he was succeeded by Charles II., who died without an heir in 1700. This brought on the War of the Spanish Succession, which ended in 1713 by the Treaty of Utrecht, and Philip V., the first of the Bourbon kings, was recognized as sovereign of Spain. By its terms he lost Naples, the island of Sardinia, Sicily, Milan, Gibraltar, Minorca, and the Netherlands. However, he strengthened the kingdom at home. In 1746 Ferdinand VI. ascended the throne, and he was succeeded in 1759 by Charles III. The period of these three kings was one of general prosperity, and in the reign of the last mentioned the Inquisition was broken by banishing the Jesuits in 1767. Charles IV. succeeded to the throne in 1788, but abdicated in favor of Ferdinand VII. in 1808. In the same year Joseph Napoleon was made king by his brother and governed until 1813, when Ferdinand VII. was restored by an army of the European allies under Wellington. It was in this period, in 1800, that Spain ceded Louisiana to France.

While the wars against Napoleon were in progress the Spanish colonies of South America asserted their independence, Florida was sold to the United States in 1819, and a revolution in 1820 abolished the Inquisition and gave the country a more liberal constitution. Ferdinand, having abolished the Salic law in 1822, was succeeded by his daughter as Isabella II. in 1833, under the regency of her mother. Don Carlos, a brother of Ferdinand and a pretender to the throne, raised a revolt, which was suppressed. The queen was declared of age in 1843, but her reign was disturbed by numerous revolts and party intrigues, causing her to flee from the country several times. She was finally exiled and Amadeus, second son of Victor Emmanuel of Italy, was elected king by the Cortes in 1870, but this sovereign resigned after a disturbed reign of three years. Soon after an attempt was made to establish a republic, but this project failed, and Alfonso XII., son of the exiled Isabella, became king in 1874. After his death, in 1885, his wife, Maria Christina of Austria, became queen regent of her infant son, Alfonso XIII. An extended war in the island of Cuba, which had grown highly destructive, finally caused the United States to intervene in behalf of the revolutionists in Cuba, and war between the two nations was formally declared by the United States Congress on April 25, 1898. Every battle on land and sea resulted favorably to the United States. The treaty of peace signed at Paris on Dec. 7, 1898, gave independence to Cuba and ceded Porto Rico and the Philippines to the United States, but a

payment of \$20,000,000 was made to Spain for the Philippine Islands. Alfonso XIII. (q. v.) became of age in 1902, when he assumed full charge of the government. He adopted a conciliatory policy and did much to extend trade and develop the resources of the country.

SPALDING (spal'ding), John Lancaster, archbishop, born at Lebanon, Ky., June 2, 1840. He was educated at Mount Saint Mary's College and at the University of Louvain, Belgium, and in 1863 was ordained priest. In 1869 he became secretary and chancellor of the diocese of Louisville, serving until 1877, when he was appointed to the same position in the diocese of Peoria. President Roosevelt made him a member of the commission to investigate the coal strike of 1902. As a social reformer and leading spirit in educational movements he attained considerable prominence. His writings include "Things of the Mind," "Socialism and Labor," "Education and the Higher Life," "Thoughts and Theories of Life and Education," and "Religion, Agnosticism, and Educa-tion." He died Aug. 25, 1916.

SPANDAU (spän'dou), a city of Germany, in the Prussian province of Brandenburg, about seven miles west of Berlin. It occupies a favorable site at the confluence of the Havel and Spree rivers, has railroad and electric street railway facilities, and is noted as an industrial center. The manufactures include woolen and linen goods, gunpowder, firearms, and machinery. It is strongly fortified, having a citadel well adapted to prolonged defensive operations, and is an important military depository of Germany. It has a garrison of 3,750 men and the government operates the factories which produce heavy ordnance and gunpowder. The city has long been an important strategic point. It was captured by the Swedes in 1634 and by the French in 1806. Spandau became a territory of the Prussians in 1813 and since then has been greatly improved. Population, 1905, 70,295; in 1910, 84,919.

SPANIEL (spăn'yěl), an extensive breed of dogs, distinguished by large, drooping ears, an affectionate disposition, and long, silky hair. The three most common species include the lamb spaniels, water spaniels, and toy spaniels. The color of most spaniels is a livered tint, but white with brown or black markings is not infrequent. The Maltese, Blenheim, and King Charles dogs are small species of spaniels. Most dogs of the spaniel breed are highly intelligent

and very obedient.

SPANISH-AMERICAN WAR, an armed conflict between Spain and the United States, brought about in 1898 through the failure of Spain to provide and maintain a stable government in Cuba. Bloodshed and unrest had disturbed the public affairs of the island for nearly fifty years, and American citizens who had invested in securities and enterprises had no rights that Spain sought to protect. A condi-

tion of war existed in Cuba from 1868 until 1878, known as the Ten Years' War, and this was followed by a brief period of peace. The Cubans rebelled in 1895 and sought to establish an independent government, but they were repressed with unusual cruelty and severity, and the conditions of famine and devastation became very severe. Secretary of State Olney, in 1896, represented the interests of American commerce to the authorities in Spain and President Cleveland pointed out that the United States should consider the interests of the Island from the standpoint of higher obligations than those due to Spain. Congress appropriated \$50,000 for the relief of the suffering Cubans in 1897.

Early in 1898 the United States dispatched the battleship Maine to the harbor of Havana to protect American interests, and many contributions were sent for the Cuban reconcentrados. The battleship Maine was destroyed by the explosion of Feb. 15, 1898, and this greatly inflamed the Americans, though it was impossible to place the blame upon officials of Spain. However, Congress appropriated \$50,000,000 for national defense and in March an American commission reported that the Maine had been destroyed by a submarine mine. Congress made the declaration that "the people of Cuba are and of right ought to be free and independent,' and on April 25 issued a declaration of war. While Spain was requested to relinquish Cuba, the President was authorized to accomplish that result by using the army and navy of the United States. On April 23 the President called for 125,000 volunteers and the same day the first gun was fired, when the Nashville captured the Spanish merchantman Buena Ventura.

Spain had a force of 60,000 men in Cuba and its fleets were at that island and in the Philippines. The United States rapidly mobilized 200,000 volunteer troops, a second call for 75,000 men having been made in May. Camps of instruction were established near Tampa and Chickamauga, and the naval forces were utilized to blockade the ports of Cuba. Commodore George Dewey, on April 30, destroyed the Spanish fleet at Manila Bay, where the Americans lost six wounded, while the Spanish loss was 634 killed and wounded. General Merritt was dispatched to the Philippines with troops to penetrate the islands. In the meantime Admiral Cervera had taken a position in the harbor of Santiago, where his fleet was discovered by Commodore Schley. The latter was superseded by Admiral Sampson on June 1, after which Richmond Pearson Hobson made his daring exploit to sink the collier Merrimac with the view of locking the Spanish fleet into the harbor.

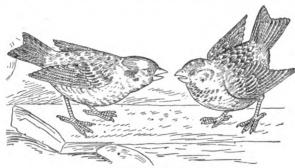
General Shafter sailed from Tampa, Fla., with transports bearing about 17,000 men and officers. With these he attempted to capture the harbor and fleet at Santiago, being aided by about 5,000 Cuban troops under General Garcia. The Span-

iards offered resistance at Las Guasimas, where the Americans under General Wheeler lost 68 men. The battle of El Caney was won by the Americans on July 2, in which the Roughriders under Colonel Wood played an important part. Cervera, hoping to gain by the American movements on land, attempted to escape from the harbor of Santiago on the 3d. The Spanish fleet was immediately pursued by every ship in the American squadron, and in the course of a few hours the six Spanish vessels were destroyed or captured. About 350 Spaniards were killed in the battle, Cervera and 1,700 men and officers were captured, while the Americans lost only one man killed and ten wounded. The siege of Santiago continued until July 15, when General Toral surrendered. General Miles, on July 27, landed at Ponce, in Porto Rico, and a few days later took possession of the island in the name of the United States. General Merritt arrived at Manila on the 25th, where he assumed command of 20,000 American troops, and on Aug. 7 captured the city, taking about 11,000 prisoners.

The war was concluded by the Treaty of Paris, negotiated at Paris, France, on Dec. 10, 1898. By its terms Spain surrendered Guam, the Philippines, and Porto Rico to the United States on payment of \$20,000,000, but retained certain commercial privileges in the Philippines. At the same time Spain relinquished all claim to Cuba. The expense of the war to the United States is placed at \$165,000,000, up to Oct. 31, 1908. Within that period 2,910 Americans lost their lives, but all except 306 died This successive loss of life from disease. caused the suspicion that the camps were mismanaged, but an investigation proved that it was due principally to the climatic conditions of the semitropical countries in which the army and navy operated, the United States' forces being largely unaccustomed to the conditions found there.

SPARKS, Jared, historian and biographer, born in Willington, Conn., May 10, 1789; died in Cambridge, Mass., March 14, 1866. After graduating from Harvard University, in 1816, he became minister of a Unitarian church in Baltimore, and in 1821 was made chaplain of the United States House of Representatives. He was editor of the North American Review from 1824 to 1831 and went to Europe within that period to study colonial archives. In 1839 he became professor of history at Harvard University. His writings include "Life of Gouverneur Morris," "Life of John Ledyard," and "Library of American Biography." He edited the "Works of Benjamin Franklin," "Writings of George Washington," and "Diplomatic Correspondence of the American Revolution."

SPARROW (spăr'rô), a genus of birds of the finch family, which are widely distributed in North America and Europe. The American sparrows include several species of small birds, among them the song sparrow, chipping sparrow, field sparrow, and fox sparrow. The color is mostly brown with white and black markings, and they are noted for being tame and greedy. The house sparrow is native to Europe, but was introduced in Canada and the United States in 1862. Since then these birds have spread over most of North America, owing to the rapidity with which they increase. In some localities a small sum is paid for their destruction, and in several instances legislatures appropriated funds for that purpose. They are noted for feeding with much greed upon caterpillars and other



HOUSE SPARROW.

insects, but frequently prove a pest to the market and fruit gardener. In the winter season they congregate in cities and about buildings, both for shelter and food. They nest on the ground and in bushes, usually laying from four to six eggs with spots of dark brown.

SPARROW HAWK, the common name of several small falcons. They are about twelve inches long with an alar extent of twenty inches. The wings are short and they have a curved bill and long, slender legs. The plumage is of a brownish color, usually diversified by darker spots, and the male has dark brown shades on the upper side of the head. Both sexes incubate. These birds are bold and skillful in attacking their prey, which consists of sparrows, pigeons, lizards, mice, young chickens, and insects. The American sparrow hawk is a handsome bird and is allied to the kestrel. Several species of sparrow hawks are native to Europe and Australia.

SPARTA (spär'tà), or Lacedaemon, a city of ancient Greece, the next in power to Athens. Anciently it was the capital of Laconia. It occupied a fine site on the Eurotas River, about twenty miles from the Mediterranean, and was the chief city in the Peloponnesus. Mount Taygetus is situated at the rear of its site, rising to a height of 7,985 feet, and other elevations make the valley and slopes occupied by the city a strategic point of easy defense. The laws of Lycurgus prescribed the architecture that should be erected, thus preventing the construction of buildings with elaborate architectural forms, and they brought about such a military spirit that

the city rose to great power in the 6th century B. c. It is reputed that Lacedaemon, son of Zeus, founded the Spartan state, and Menelaus is famed as its most eminent king.

Sparta joined Athens and other cities of Greece in the war against the Persians and Leonidas, King of Sparta, commanded the Grecian forces at the celebrated pass of Thermopylae. Later a spirit of rivalry rose between the two great cities, which caused the Peloponnesian War in 431 B. C., a contest continuing 29 years. The war terminating favorably to Sparta, it became the predominating influence in Greece,

and under King Agesilaus waged an extended war against Persia. During that period Athens revived in power. From 378 to 363 B. c. the celebrated Theban War took place, when the Thebans conquered Sparta, and the city never again rose to its former greatness. Cleomenes made an unsuccessful attempt to restore its former power in 235, but at that time many foreigners had settled in the city, while the small per cent. of remaining Spartans had been reduced to a state of poverty. The Romans finally conquered Sparta and other Grecian cities in 146 B. c.

The laws of Lycurgus are supposed to date from 825 B. C., and their influence upon Spartan life and industries was very marked. The development of the mind was sacrificed to that of the body. Physical strength and military skill were the qualities most desired in the citizens, the sole object being to train soldiers for the defense of the state. This system gave rise to ignorance, but inculcated habits of courage and sobriety. Athens taught the arts of fine speaking, while Sparta inculcated brave acting and laid the foundation for skillful captains and wise magistrates and legislators. Three classes of society existed in most of the period that Sparta flourished. The governing class was made up of the Spartiatai, the free middle class was constituted of the Perioikoi, and the slaves were the Helots. Those who were unable to pay their debts, and the captives of war, were reduced to the Helot condition, while the skillful in physical exercises and military accomplishments gained promotion to the governing class. Children of weak or defective constitution at birth were not allowed to live, while all the strong and vigorous became the charge of the state.

Sparta maintained extensive colonial, commercial, and manufacturing enterprises, and made remarkable development in the culture of cereals, fruits, and domestic animals. The Helots were bound to the soil, which they cultivated for its owners, but in cases of emergency they served in the army. Education of a high literary class was not deemed conducive to the public good as in Athens, and there was a marked difference between the instruction given males and females. The modern town of Sparta occupies the site

of ancient Sparta. It was founded by the Greeks in 1836 and is the capital of the province of Laconia. Population, 4,375.

SPARTACUS (spär'tà-kus), eminent Roman gladiator, born in Thrace in the latter part of the 2d century B. c. He adopted the occupation of his father, who was a shepherd, but he was taken captive by the Romans and became a trainer of gladiators at Capua. In this gladiatorial school were a large number of Gauls, Thracians, and Germans, who had been taken captive and enslaved, and these formed a conspiracy to undertake an insurrection against the Roman government. After escaping captivity they enlisted many slaves and a large number of peasants, thus forming an army of 75,000 men under command of Spartacus. He succeeded in conquering several cities of southern Italy and defeated two Roman armies with considerable loss to the latter. However, after he and his followers gained their liberty, Spartacus desired that his soldiers should return to their homes, but they preferred to march against the Roman capital and were met by an army under Licinius Crassus. A decisive battle occurred near the source of the Silarus River, in which the insurrectionists were defeated. Spartacus was slain in the contest. This uprising is known as the Servile War and occurred in the period included between 73 and 71 B. C.

SPARTANBURG, a city in South Carolina, county seat of Spartanburg County, in the northwestern part of the State, on the Southern and the Atlantic Coast Line railroads. The surrounding country produces fruits, tobacco, and cereals and has deposits of iron, gold, and limestone. It is a cotton-manufacturing center, and produces clothing, earthenware, and machinery. Among the noteworthy buildings are the county courthouse, the Kennedy Public Library, and the State Institute for the Deaf, Dumb and Blind. It is the seat of Wofford College, a Methodist Episcopal institution founded in 1854. Brick and macadam pavements, waterworks, sewerage, and street railways are among the improvements. Population, 1900, 11,395; in 1910, 17,517.

SPAVIN (spăv'în), the name of a disease of the horse, consisting of certain swellings upon the hock joint, which is situated in the hind leg between the knee and the fetlock. It may occur in two forms, known as bog spavin and bone spavin. Bog spavin is due to an injury of the true hock joint of the horse, accompanied by swelling and inflammation, and usually is brought on by a sprain or overwork. Bone spavin is caused by an injury and is accompanied by a bony deposit about the joint, causing a local enlargement and stiffness. In bone spavin it is necessary to give the animal rest and in most cases the lameness passes away, though the joint continues to be stiff.

SPAWN (span), the eggs of mollusks, fishes, crustaceans, frogs, and other species of animals. The eggs or ova are extruded in a mass by the

females and, after being fertilized by the male, give rise to new life in the same species. This applies only to some forms of oviparous animals, while in others the fertilization by the male is effected before the eggs are extruded. In ovoviviparous animals copulation takes place between the sexes and the eggs are hatched in the body, as in some reptiles and fishes. The eggs deposited in the spawn, as in the fishes, often reach several millions. Spawn is generally deposited near the shore, or an ascent is made of the streams to deposit the spawn in fresh water, as is done by the salmon.

SPEAKER (spēk'er), the presiding officer of a deliberative assembly, whose duty is to preserve order and see to it that the rules of debate are enforced. The presiding officer of the British House of Lords is the lord chancellor, whose appointment is derived from the sovereign, but the House of Commons elects its own speaker, subject to the approval of the crown. The latter can only speak or vote in committee, except in the case of an equality of votes, when he gives the deciding vote. He holds office until the dissolution of the Parliament of which he was elected speaker. Since the office is nonpolitical, the speaker may hold during opposing and successive administrations, and is usually rewarded with a peerage on retiring.

In the United States the speakership of the House of Representatives is a political office and the speaker owes his election to the majority party. He has the right to appoint the standing committees and is the acknowledged leader of his party in the house. Since he is the chairman of the Committee on Rules, he exercises a wide influence over the course of legislation, and his power to recognize any one who may desire to speak is absolute. He has the right to vote on any measure, signs all bills and resolutions, and practically decides what shall be considered and how long the debates shall continue. By a majority of the house he may be removed from office.

SPEAKING TRUMPET, a metallic tube with a small end fitted to the mouth and considerably enlarged or widened at the other extremity. It is used for giving greater intensity to the voice, as the sound is forcibly projected through it. The megaphone, an inexpensive kind of speaking trumpet, is used extensively at public gatherings, such as horse races. Instruments of this class were used by the ancient Greeks, and it is reported that Alexander the Great used one in giving orders. The modern speaking trumpet was invented by Sir Samuel Morland (1625-1695) and has been variously modified and improved. The larger sizes are from three to five feet in length and make it possible to understand the human voice several miles. This is due to the fact that the sound is intensified by successive reflections from the walls of the tube, and that the aërial undulations which produce it are thus carried forward in a collected body on the line of the axes of the trumpet.

SPEARMINT (spēr'mint). See Mint.

SPECIE PAYMENT (spe'shi), Resumption of, the term used in American history in reference to the resumption of coin payments after the Civil War. At the beginning of the conflict, in 1861, the banks of New York City were required, owing to the disturbed conditions of business, to suspend payment in coin, and in this course they were followed by most of the banks throughout the country. Congress came to the relief by authorizing the issue of large quantities of United States notes, making them a legal tender for all purposes, except payment of interest on the national debt and duties on imports. This caused the paper money, known as greenbacks, to depreciate in value, and had the effect of bringing about uncertainty in financial and commercial affairs. In 1866 Congress passed an act to retire the greenbacks by the payment of specie, at which time the amount in circulation was \$356,000,000, but this did not have the desired effect. The matter of resuming specie payment was taken up in earnest in 1875, when Congress ordered that government contracts, including paper currency, should be payable in specie on and after Jan. 1, 1879. Gold and silver bullion was accumulated in the treasury through the sale of bonds and the mints were run over business hours for some time. The resumption of specie payment caused an increase in the value of currency, hence prices decreased correspondingly, and those in debt suffered losses and hardships in that they were compelled to make payments in money whose value was increasing rapidly.

SPECIES (spesshez), the term used to denote a single group of animals or plants, which are subordinate to a genus and are capable of reproducing similar organisms by interbreeding. In the kingdom of organic nature the species are founded on identity of form and structure, both external and internal. The species have capability of producing beings like themselves, and the offspring likewise possesses the power of reproduction. The term species is applied in mineralogy and chemistry in inorganic substances having identity of composition, physical

properties, and crystallization.

SPECIFIC GRAVITY (spē-sĭf'ĭk grāv'ĭ-ty), or Relative Weight, the ratio of the weight of a substance to that of the same volume of another substance taken as a standard of comparison. Since temperature and other agencies have an influence upon the weight of a given bulk of matter, it is necessary to know the temperature in all exact measurements of standards. Pure distilled water at a temperature of 62° Fahr, is taken as the standard for measuring the specific gravity of liquids and solids, which is reckoned unity, and air is the standard for designating the specific gravity of gases. A pint of mercury weighs 13.6 times as much as a pint

of water; thus, if we compare the weights of equal bulks of mercury and water, we find that the mercury is 13.6 times as heavy as water. Hence, the specific gravity of mercury is 13.6.

According to Archimedes' law, a body in water is buoved up by a force equal to the weight of the water it displaces. To obtain the specific gravity of any substance heavier than water, a given bulk is weighed in pure distilled water, then in air, and the specific gravity is found by dividing the weight in air by the loss of weight in water. The specific gravity of solids lighter than water, such as a piece of cork, is found by attaching a given bulk to a piece of metal heavy enough to sink the cork in the water. The weight of cork in air being known, it is divided by the weight it loses in water (which is found by ascertaining the loss of weight to both the copper and cork; then finding the weight lost by the copper when immersed; then the difference in this weight and the weight they both lose in water; the result is the weight that the cork loses in water), and the quotient equals the specific gravity.

Specific gravity may vary slightly in different specimens of the same substance, but in the table below is given the specific gravity usually assigned to the common substances named:

Platinum	Sulphur2.00
Gold19.30	
Granite 2.75	
Copper 8.90	Ice
Zinc 7.15	
	Quicklime
Silver10.47	Pine Wood
Mercury	Cork
Cast Iron 7.21	Ocean Water
Iridium21.80	Sulphuric Acid1.84
Glass 2.90	
Honey 1.45	Ether
Diamond 3.50	Bone1.75
Chalk 2.65	Liquefied Oxygen1.12
Cobalt 8.95	Human Body, alive89

SPECIFIC HEAT, the amount of heat required to raise the temperature of a given quantity of that substance, one or more degrees, as compared with the amount of heat required to raise an equal quantity of some other substance through the same number of degrees. water possesses the highest specific heat of any common substance, it is generally taken as the standard of comparison. However, the specific heat of a substance varies with its condition. A given substance has a greater specific heat in the gaseous than in the liquid state, and its specific heat is reduced by converting it from the liquid to the solid state. As compared with water taken as a standard at 32° Fahr., if the specific heat is 1, the specific heats of an equal weight of wrought iron is 0.114; alcohol, 0.659; vinegar, 0.920; mercury, 0.033.

SPECTACLE (spěk'tà-k'l), an instrument for aiding or shielding the eyes. It consists of a pair of lenses, which are framed, usually with metal, so as to keep them in their proper position. The lenses are made of a fine quality of glass and are ground to accommodate the need of the wearer. As eyesight becomes weakened

in old age, it is frequently necessary to change the glasses, which is also the case with those wearing spectacles to shield the eves from light too strong for them to bear. Long sight, or far-sightedness, is remedied by wearing convex glasses, which converge the rays of light on the retina of the eyes. Short sight, or near-sightedness, on the other hand, requires concave lenses, which diverge the rays of light to cause the image to be formed on the retina. Astigmatic sight is a defect of the eyes in which the focus of the crystalline lens varies in different azimuths, and can be remedied by spectacles in which the focus differs in different azimuths. In most cases of defective eyes it is advisable to consult an optician, that glasses may be practically adjusted. Spectacles of wire gauze are worn to exclude dust particles. That class of devices is commonly called goggles. Most spectacles have numbers engraved on their glasses to indicate their focal length in inches. It is best to have the spectacles close to the eye, and so adjusted that they make the distance of distinct vision about twelve inches.

SPECTROSCOPE (spek'trō-skōp), an optical instrument used to separate rays of light into their prismatic colors, so as to determine the substance, which may be done from the position from the spectral lines. This instrument enables us to examine the spectra of solar light, as well as those produced by flames in which different substances are volatilized. See

Spectrum.

SPECTRUM (spěk'trům), the colored image or images produced when the rays from any source of light are decomposed or dispersed by refraction through a prism. The law of refraction of light was discovered by Willebrord Snell (1591-1626), a Dutch mathematician, in 1621, and by its aid Descartes explained the rainbow. Later Newton investigated the decomposition of light, after an examination of the spectrum of sunlight, which he carried on by means of intercepting with a prism the light coming into a dark room through a hole. The most common form of spectrum used in study is produced by the light of the sun passing through a triangular glass prism and falling on a screen. Ordinarily sunlight produces the sensation of white light on the eye, but when it falls on a glass prism the component colors are unequally refracted or bent out of their course in passing through the glass, and become spread out into a band displaying the seven rainbow colors. The violet is at one end of the series and the red is at the other, the order being violet, indigo, blue, green, yellow, orange, and red. The order may be remembered by the word vibgyor, formed by the initial letters, though there are a large numher of different shades where the component colors overlap each other. Any luminous body gives off a spectrum, which is characterized by the particular ingredients of which it is composed.

In order to determine the composition of a substance, it is necessary to reduce it to a gas or vapor and heat the gas or vapor until it emits light, when the light may be examined. The unaided eye is unable to detect all the differences in the light given off by the different gases of glowing vapors, unless the various colors of such light are separated from one another in its passage through a prism. An instrument called the spectroscope, or spectrometer, is used for that purpose. This instrument consists of four essential parts: the part designed to volatilize the substance to be examined and heat its vapor to luminosity; a tube with a plate containing a narrow slot at one end, so as to limit the amount of light thrown on a convex lens at the other; a prism, or a number of prisms, through which the light passes for the formation of the spectrum; and a microscope with which to examine the spectrum so formed. The examination of a spectrum is called spectrum analysis. The light of the sun and of many stars has been examined by spectrum analysis, and these heavenly bodies have been shown to contain some of the same elements as those which exist in the crust of the earth. Spectrum analysis has been employed successfully in physiology and pathology and for the discovery of metals, such as iridium and rubidium.

SPECULUM (spěk'ú-lům), an alloy of tin and copper, usually in the proportion of 58 parts of tin to 126 parts of copper. It is employed in preparing the reflecting surfaces in several kinds of telescopes. Glass is now frequently used for the same purpose, being prepared by spreading a covering of silver film over the side turned toward the object. In surgery, a speculum is an instrument for dilating canals and cavities in the human body, as in the ear, thus facilitating an examination of their interior. A reflecting body is an essential part of these instruments, since it serves to facilitate an examination of the parts by throwing upon them

a strong light.

SPEECH, the vocal sounds uttered to communicate ideas, produced by a modification of the vibrations generated in the larynx. These modifications take place as the vibrations pass outward through the cavities of the mouth and nose. Speech appears to be controlled by the nerve centers that are seated on the left side of the brain, in the back part of the third frontal convolution. While speech is natural, its exercise depends upon careful training, articulate speech is stopped by pressure or injury to this part of the brain, but it does not necessarily prevent vocalization, nor does it prevent the expression of thought by signs or by writing. See Voice.

SPEEDWELL (spēd'wĕl), a genus of herbs and shrubs native to the temperate regions of both hemispheres. They include about 200 annual and perennial plants. Many species produce beautiful flowers, generally colored blue,

pink, or white. The common speedwell, having bitter and astringent leaves, is used to some extent in medicine and as a substitute for tea. Brooklime, a common wild plant of Europe and North America, belongs to this genus. It has ovate or oblong leaves and bluish flowers.

SPEKE (spēk), John Hanning, eminent explorer, born in Bideford, England, May 24, 1827; died Sept. 15, 1864. He attended the Barnstable grammar school and in 1844 embarked for India, where he served in the Bengal infantry during the Punjab War. While in the service he collected numerous natural history specimens, which he placed at the disposal of the Royal Geographical Society of London, and in 1857 was engaged by that association to explore the great lakes and interior of tropical Africa. After discovering Lake Tanganyika, he proceeded northward and discovered the southern region of Victoria Nyanza, but soon after returned to England. He made a second tour in Africa in 1860, accompanied by Captain Grant, and in that year discovered that the Nile is the outlet of the great African takes. The published accounts of his travels were verified by Stanley in 1876. Speke returned to England in 1863 and the following year was accidentally shot while attending a shooting match near Bath. He published accounts of his discoveries in two works entitled "What Led to the Discovery of the Source of the Nile" and "Journal of the Discovery of the Source of the Nile."

SPELLING REFORM, the movement to simplify the spelling of certain words in the English language. A board to promote this movement was organized under the chairmanship of Brander Matthews, in New York City, in 1906, funds for the purpose having been supplied by Andrew Carnegie. The first list of 300 words to be simplified was published in March of the same year. President Roosevelt recommended that the departments of the government use this simplified spelling and later presented the matter to Congress, but that body did not adopt the proposed simplification. However, the National Educational Association approved the 300 words in a meeting held in 1907, although the board of directors of this organization restored three words that the association had simplified ten years before.

The movement was reorganized on a very satisfactory basis in 1908. At present the Simplified Spelling Board consists of about 43 members and several representatives of English-speaking countries aside from the United States. The board is assisted by 165 scholars and educators who are engaged in university and public school work. The recommendations formulated by means of this movement were approved by 300 periodicals, 2,000 business houses, 3,000 institutions of higher learning, and 18,000 educators. Among the simplifications are to use e instead of ae in aesthetic, er instead of re in meter, and f instead of ugh in draught. The

following are examples of words spelled according to the system recommended:

abridgment	curst	paragraf
affixt	cyclopedia	pedagog
altho	decalog	quartet
anesthetic	demagog	silvan
antitoxin	dettor	subpena
blest	ecumenical	thorofare
catalog	envelop	thruout
cifer	esophagus	winkt
claspt	favor	woful
comprest	gelatin	yoman
coquet	mama	

SPELTER. See Zinc.

SPENCER (spěn'sēr), a town in Worcester County, Massachusetts, ten miles west of Worcester, on the Boston and Maine Railroad. It has the Richard Sugden Library, several fine schools, and Spencer Public Park. The manufactures include boots and shoes, underwear, wire, woolen goods, machinery, carriages, and clothing. It has good municipal facilities, such as waterworks, electric and gas lighting, electric street railways, and pavements. Spencer was settled in 1720, was made a part of Leicester in 1744, and became incorporated in 1753. Population, 1905, 7,121; in 1910, 6,740.

SPENCER, Herbert, founder of the system of synthetic philosophy, born in Derby, England, April 27, 1820; died Dec. 8, 1903. His

father was a teacher of mathematics in Derby, under whose direction he received careful training at home, and was early instilled with interest in natural sciences and entomology. He had delicate health and did not secure the advantages of a university education, but



HERBERT SPENCER.

in 1837 entered the office of a railway engineer, and for eight years pursued civil engineering. Within that time he contributed a number of articles to the Civil Engineers' and Architects' Journal and to the Nonconformist. He removed to London in 1848, where he became engaged on the editorial staff of the Economist, and contributed to the Westminster Review. In 1850 he published his first work of importance under the title of "Social Statics," in which the ethical and social growth of mankind is outlined largely on the theory of evolution.

Spencer announced the prospectus of his synthetic philosophy in 1860, which he proposed to give to the world in eleven complete volumes after working twenty years, but the last volume did not appear until 33 years later. This great work is comprised of five divisions, which he

classed in the following manner: the proper scope and limits of Philosophy, Biology, Psychology, Sociology, and Morals.

The writings of Spencer were appreciated much earlier in America than in England, and his visit to the United States, in 1882, was the occasion of a most enthusiastic reception. Many of his books have been translated into practically all the leading languages, and his theories have had a very wide influence from the standpoint of social, philosophical, scientific, and moral thought. He devoted his time zealously to his self-imposed task, refusing all academic honors and memberships in famous domestic and foreign societies. Among the most important of his writings not named above are "Principles of Biology," "Principles of Psychology," "Principles of Sociology," "Descriptive Sociology," "Political Institutions," "Ethics of Social Life," "Positive Beneficence," "Education," "Classification of the Sciences," "Spontaneous Generation," "Coming Slavery, or Man Versus the State," and "Factors of Organic Evolution."

SPENCER, Samuel, capitalist, born in Columbus, Ga., March 2, 1847; died Nov. 29, 1906. He graduated at the University of Georgia, in 1867, and subsequently studied at the University of Virginia. At an early age he engaged in railroading and through efficient services was rapidly promoted to fill responsible positions. In 1857 he was made president of the Baltimore and Ohio Railroad, which he rehabilitated to a large extent, and soon after invested as a stockholder in many lines of the South and the Southwest. For several years he was president of the Southern Railway, which he succeeded in placing upon a successful business basis. His death resulted from an accident while riding in his private car on an inspection tour of the Southern Railway.

SPENCER GULF, an extensive inlet on the southern shore of Australia, in the State of South Australia. It extends from the Indian Ocean toward the northeast a distance of 200 miles and is from three to 90 miles wide. Cape Spencer and the Yorke Peninsula are east of it, and Cape Catastrophe and the Eyre Peninsula lie immediately west. At its entrance are Thistle and Gambier islands. Port Augusta is at the head of the gulf.

SPENSER, Edmund, eminent poet, born in London, England, in 1553; died at Westminster, Jan. 13, 1599. Little is known regarding his parents and early training, but it is generally assumed that he lived in humble circumstances during his youth. He entered Cambridge University after taking a secondary course, graduated from that institution in 1573, and received the degree of master of arts three years later. Soon after he settled in the north of England, where he published his "Shepherd's Calender" in 1579, which he dedicated to Sir Philip Sidney.

friend, and through his influence Spenser was sent to Ireland as secretary to Lord Grey of Wilton. Soon after he received a grant of about 3,000 acres of land in Cork County, which had been taken as a forfeiture from the Earl of Desmond, and he accordingly selected Kilcolman as his residence. While there he wrote the "Faërie Queen," which he published in 1590. This is his greatest literary product. It is rich in brilliant poetical expression of the sentiments of chivalry. It was dedicated to Queen Elizabeth and brought him a small pension. In 1594 he married Elizabeth Boyle, a relative of the Earl of Cork. The sonnets he wrote during the courtship, a total of 88, were combined to form his "Epithalamium."

Rebellion broke out in the southern part of Ireland in 1598, and, since the English had shown little mercy in the island, they could expect little in return. Spenser's castle was attacked and burned, and his infant child perished in the flames. The poet was overwhelmed by his misfortune and grief and hastened to London, where he died soon after. The remains were buried in Westminster Abbey, near the tomb of Chaucer. Spenser was a man of refinement and his poetry is uniformly and exquisitely musical. It is characterized by a singular richness and sweetness of rhythm. Several of his writings are still read with an abiding interest. Among the works from his pen not already named are "The Poet's Year," "Mother Hubbard's Tale," "Colin Clout's Come Home Again," "Tears of the Muses," and a work in prose entitled "View of the State of Ireland."

SPERMACETI (spēr-mà-sē'tĭ), a white fatty substance found in the sperm oil of the head of the sperm whale and several other animals. It is in the fluid state while the animal is alive, but separates after death and forms concrete deposits differing from the sperm oil, the latter being a neutral liquid at ordinary temperatures. Spermaceti is inodorous and nearly tasteless. It has a white appearance, resembling wax, and is used largely for making candles. In pharmacy it serves as the basis of ointments and The sperm whale is a large species cerates. of the whale family native to the Pacific Ocean, often weighing 175 to 215 tons, and the male attains a length of 60 to 80 feet. A large-sized sperm whale yields 10 to 25 barrels of spermaceti and 60 to 100 barrels of oil.

SPERM WHALE. See Whale.

SPEY (spā), a river of Scotland, rising in Inverness-shire, and, after a course of 110 miles, discharging into Moray Firth. It has important fisheries, chiefly salmon. The Spey is the second longest river of Scotland, being exceeded in length only by the Tweed.

SPEZIA (spěťsě-ä), a seaport city of Italy, on the Gulf of Spezia, fifty miles southeast of Genoa. It is situated on the coastal railroad, has an excellent harbor, and is noted as the most important naval station of Italy. The

The latter was his constant and beneficent

arsenal is the finest of the kingdom Extensive manufactures of cannon, gunpowder, sailing vessels, and clothing for the army and navy are maintained by the government at Spezia. The city is provided with modern facilities and has a large trade in cereals, wines, olive oil, and fruits. Population, 1916, 66,482.

SPHENE (sfēn), the name of a mineral belonging to the titanite variety, so called from the wedge shape of the crystals. In color it varies greatly, but yellow, green, and dark brown predominate. It is found in a crystallized form

with gneiss, granite, and mica slate.

SPHERE (sfēr), in geometry, a body bounded by a surface, every point of which is equally distant from the center. The figure may be generated by the revolution of a semicircle about its diameter, which is called the axis of the sphere. A line drawn from the surface to the center is called the radius. The surface is equal to four times the area of a circle of the same diameter; and its solid contents is equal to that of a pyramid whose base is equal to the surface of a sphere, and whose altitude is the radius. Spheres are to one another as the cubes of their diameters. See Globe.

SPHEROID (sfē'roid), a body resembling a

sphere in form, but differing from it in not being perfectly spherical. It may be generated by a revolution of an ellipse about one of its axes. If this be the conjugate axis, the spheroid is termed *oblate*; if the transverse axis, it is said to be *prolate* or *oblong*.

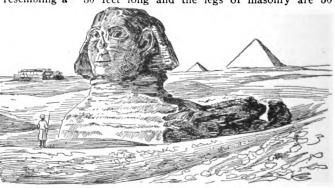
SPHEROIDAL STATE, the form assumed by a liquid when thrown on a surface of highly heated metal. This may be illustrated by placing a small quantity of water upon a highly heated metal surface, when it rolls about in spheroidal balls or masses.

The temperature of the drops is a few degrees below the boiling point, owing to the fact that they are not in actual contact with the heated surface, but float on a cushion of nonconducting vapor. Any liquid in the spheroidal state evaporates rapidly by the heat radiated from the surface.

SPHINX (sfinks), an ancient Egyptian divinity, who personified wisdom and the fertility of nature. This goddess was transplanted to Greece, where it became possessed with malignant power and partook of the nature of a monster. When Hera became displeased with the Thebans, she sent this monster as a punishment for their offenses. Sphinx had her seat on a rocky eminence near the city of Thebes, which commanded a pass that the Thebans were compelled to traverse in their way of business, and propounded a riddle to all comers. She tore all persons to pieces if they

failed to solve it. King Creon became grieved at the number of people that fell prey to the monster and, on consulting the oracle of Delphi, was informed that Sphinx could be destroyed by solving one of her riddles. Oedipus, being offered the crown and Jocaste in marriage by the king, proceeded to the spot where Sphinx was seated. The riddle propounded was, "What creature goes in the morning on four legs, at noon on two, and in the evening on three?" Oedipus promptly replied, "Man: since in his infancy he creeps on all fours, in his prime walks on two legs, and when old age has enfeebled his powers, he brings a staff to his assistance, and thus has three legs." The solution being correct, Sphinx flung herself over the precipice and perished in the abyss below. Sphinx was represented in Egypt with the body of a lion and the head of a woman, but the Grecians sculptured sphinxes with the bust and head of a male.

The Great Sphinx of Egypt is a representation of the goddess Sphinx. It is hewn from solid rock, with feet built of masonry. The body of the sphinx is 172 feet long and rises about 66 feet above the surface. The head is 30 feet long and the legs of masonry are 50



SPHINX AND PYRAMIDS AT GIZEH.

feet, stretching forward almost parallel to its sides. This structure, being near the pyramids of Gizeh, is thought to have been built about the same time. Other sphinxes occur in different parts of Egypt, some having the heads of rams or hawks, but none approaches the Great Sphinx in size. Originally the Great Sphinx had a beard, and a cap covered its head, but now only traces of these remain, and the countenance is mutilated so that the outlines of the features can scarcely be traced. It is supposed to be the work of Chephren, a king of the fourth dynasty.

SPHYGMOGRAPH (sfig'mō-grāf), an instrument used to measure and record the flow of the blood in an artery. It is placed over the pulse, or some part of the body where the pulse beat is distinct, and by this means a series of delicate levers are set in motion, recording the results of the measurement on a

moving surface of paper. This instrument not only records the frequency of the pulse beat, but gives a record of the shape and force of the blood wave. The sphygmograph, when combined with a microphone, constitutes a sphygmophone, an instrument for determining by the ear the rhythm of the pulse of a person at a distance.

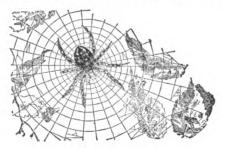
SPICE ISLANDS. See Moluccas.

SPICES, a class of aromatic and pungent vegetable substances, used extensively for flavoring food and as condiments. The production of spices is an important industry in many tropical countries, especially in the warmer regions of Asia and the East Indies, but large interests are vested in the growth and preparation of these commodities in the West Indies and tropical America. Spices were brought from Arabia and other countries of the East to Europe in the Middle Ages, and Arabia is still a noted spice-producing and trading country. The aromatic and pungent properties of spices are due chiefly to essential oils, but different parts of various plants produce spices of value. Cloves are derived from the bud, cinnamon from the bark, pepper and nutmeg from the fruit, and ginger from the root. The clove tree is native to the Molucca Islands, from the flower bud of which the cloves of commerce are obtained. These trees attain a very old age, often yielding products for 75 to 200 years, and their branches grow to a height of forty feet. Cloves produce the essential oil of cloves, while the blossom of the clove tree yields the spice, which is gathered and dried before quite in full bloom.

The cinnamon tree is native to Ceylon, but it has been naturalized in Southern Asia and tropical America. Cinnamon is obtained from the inner bark, which is taken from the tree in strips about four feet long and tied into packets or bundles. The bark ferments slightly within a short time, thus causing the inner bark to become separated, which is dried and put in small crates for the market. Many species of pepper have been described, but the common grades of black and white pepper of the market are secured from a climbing shrub, and the berries, about the size of a small pea, grow in pods containing about fifteen to thirty each. Their color, when ripe, is yellowish and, when dried, they turn to a dull black. The black pepper usually sold in the market is obtained by crushing or grinding the whole berry, but the outer covering is removed to obtain the white pepper. Cayenne pepper is native to South America, but is grown at present in different sections of the Temperate zones as a condiment and for medical use. The nutmeg tree is cultivated in various parts of Asia, Africa, and tropical America, and yields both the nutmeg and mace. The fibers surrounding the nut are the mace, which has a reddish color when fresh, and afterward assumes a light brown tinge under exposure to the sun. The kernel or seed within the mace is the nutmeg, which, when shelled, is dried and is then ready for the market. Nutmegs are valued highly in cooking for their aromatic flavor and odor, and both the nutmeg and the mace yield a highly useful oil by compression.

Ginger is prepared from the rootstalk of a tropical plant native to the West and East Indies. It is used in cookery and medicine. White ginger, produced largely in Jamaica, is prepared by scraping off the outer covering of the roots. It is regarded superior to the black or East India ginger, in which the covering is not removed. Mustard is the seed of the mustard plant. It is crushed and adapted for use as a condiment and for medical purposes. Several species are cultivated, as the white and black mustard native to Asia and Africa. The wild mustard is a very prolific plant in many sections of Canada and the United States, and the seed is sometimes employed as a condiment by mixing with the seed of cultivated species and not infrequently for medical use, especially as a poultice. Vanilla is the product of a climbing orchid, the fruit being known as the vanilla bean. It supplies the vanilla of commerce and yields a delicate aromatic odor used in flavoring syrups, ice cream, and confectionery. The plant is native to Florida and to many sections of Asia and the Pacific islands.

SPIDER (spī'dēr), an extensive division of animals, which includes the scorpions and mites. Although they are often classed with the in-



SPIDER AND WEB.

sects, they constitute the class of animals known as Arachnida. The spiders differ from most insects in that the body consists of only two segments instead of three, the head and chest being united to form one segment. Spiders have no wings and are supplied with eight legs, instead of six, as in insects, and they likewise differ from the latter in having no antennae or feelers. They breathe by means of well-developed pulmonary or lung sacs, and do not pass through several changes in life, like some insects, but their shape at birth is the same as in the adults. The organs of sight are not highly developed, although they have six or eight eyes, but they possess a keen sense of touch.

In the abdomen of spiders are four to six

conical processes, seated in a fleshy formation, and these are perforated by a large number of small tubes or orifices. From these tubes are drawn very fine but wonderfully strong threads, and with them many species weave artistically complicated webs. The webs serve a number of useful purposes, but are intended chiefly to entangle the heedless insects on which they prey. Some species construct webs as a place of abode and as a means to pass easily from place to place. They seldom leave a locality without spinning a thread. This thread they utilize as a means of descending from any height as well as to again elevate themselves, which they do by taking up the thread, but it is not used a second time. Spiders have been observed to hang suspended by a long thread with the view of being driven by the wind against some object at a short distance, in this way securing passage across a considerable space, even across a narrow stream.

Caterpillars spin their threads from the head, but spiders do so from the back part of the body. They descend with their head foremost and ascend forward, using their comblike claws to guide and manage the thread. The webs are variously constructed in different species, and they differ in strength and workmanship quite as much as do the nests of birds. The threads are gummy when first issuing from the tubes, thus facilitating their attachment to different objects and to each other, and when the web is finished the spider lies in wait for the heedless insects that may happen to rush into the snare. As soon as the insect is entangled, the spider rushes upon it, inflicts a severe wound, and fetters the prisoner with a winding silken thread. The wound is inflicted with the hooked mandibles, from which a poisonous fluid passes into the opening, whose effect is to almost instantly kill the prey. Flies are the favorite food of the spiders, but they feed with greed on various other insects. The poison is secreted by a gland near the upper joint of the mandible, and some species, as the tarantula in the southwestern part of the United States, inflict wounds that are dangerous even to man.

The spiders include many interesting species. They are found in all countries, but attain their greatest number and largest size in the tropical regions. Most species spin a silken cocoon in which to deposit their eggs. They are remarkable for being attentive to their young. The number of eggs varies greatly, ranging frequently from 50 to 2,000, but many of the young hatched from them die before reaching maturity. Female spiders spin five to seven webs in a season, but the males are seldom seen at this kind of work. They are inclined to hide during the day much more closely than the females, and at night come out to pass from web to web. Among the different classes are the sedentary or com-mon house spiders. They are widely distributed, and are subdivided according to the manner of constructing their webs. The hunting spiders weave silken tubes for an abode, and rush out to seize their prey, on which they leap with great greed. A class known as water spiders makes

their homes among the stems and leaves of aquatic plants, constructing their webs under water, and their eggs are attached to leaves or stems of plants below the surface, but surrounding them is a watertight structure containing atmospheric air brought down by the adult spider. The most curious nests are built by the trapdoor spiders. They are constructed in a burrow under the ground, and admission to it is by a lid or door attached by a kind of silken hinge. Some species native to South America are about the size of a man's thumb, and are able to seize



SPIDER'S FOOT, MAGNIFIED.

and kill little birds. Spiders are preyed on by toads, wasps, and different species of birds. See Gossamer.

SPIKENARD (spik'närd), or Nard, an aromatic plant. The roots are three to twelve inches long and send up little spikes bearing purple flowers. The ancients gathered the roots for preparing valuable perfumes to be used at feasts and in baths, and they still have a wide use for that purpose and in medicine. Christ was anointed with the ointment of spikenard while in the house of Simon in Bethany. The plant is native to India and China, and is found in the Himalayas to elevations reaching 15,000 feet. The name is applied to an American plant of the ginseng family, somewhat resembling the wild sarsaparilla.

SPINACH (spĭn'āj), or Spinage, a genus of herbaceous plants of the goosefoot family, extensively cultivated in gardens to be used as greens. This product is eaten as a salad, or is boiled in various ways, usually with butter. The leaves grow on long footstalks and are best when quite young. Spinach is most juicy and best flavored when the growth is luxuriant. It becomes bitter at the appearance of a long stem, which bears spike-formed flowers. Several species are cultivated, among them the prickly, smooth, and Australian spinach.

SPINAL COLUMN (spī'nal köl'ŭm), or Spine, the backbone of vertebrate animals, which is made up of a series of bones called the vertebrae. Each vertebra consists of a solid part, of an open ring, and of three major projections or processes. The human spine has 24 movable vertebrae, seven of which are known as cervical; twelve, as dorsal; and five, as lumbar. At the base of the spine are five false vertebrae, which unite in the adult to form the sacrum, and below them are four small bones that unite in the adult to form the coccyx. The vertebrae

comprise a succession of rings of bone, within which is a cavity called the spinal canal, which extends from the base of the skull to the lower end of the vertebral column. Within the spinal canal is the spinal cord, with its membranes and vessels.

SPINAL CORD, the cordlike structure situated in the spinal column of vertebrate mammals, constituting a part of the central nervous system. The spinal cord in man has an expansion just as it starts from the brain, called the medulla oblongata. It is from fifteen to twenty inches in length. The function is to transmit outgoing and incoming nerve impulses, and it is the seat of the centers of reflex action. It is securely lodged within the long cavity of the vertebrae and is protected by a double membrane called the arachnoid, within which is the cerebro-spinal fluid. A fine tissue, known as the pia mater, is within the arachnoid, and surrounding the whole is a tough membrane called the dura mater.

The spinal cord differs from the brain in that the white matter is on the outside and the gray matter is within. From the spinal cord spring 31 pairs of spinal nerves. Of this number one pair issues from the coccyx and five pairs proceed from the sacral region. Five pairs are known as lumbar and twelve pairs as dorsal nerves. Eight pairs in the region of the neck are called the cranial, or cervical nerves. Each nerve arises by two roots; the anterior is the motory and the posterior is a sensory one. When the anterior root is cut, the power of motion is lost and, when the posterior is cut, that of feeling is destroyed. Spinal congestion, meningitis, paralysis, and hemorrhage are among the diseases of the spinal cord.

SPINDLE (spĭn'd'l), the slender rod or pin in a spinning wheel, by which the thread is twisted, after the fiber has been drawn from the distaff. It is usually long and slender, and in most cases is made of metal, though formerly it was exclusively of wood. The name spindle is also applied to the pin on which the bobbin is held in the shuttle of a loom, or in a spinning wheel.

SPINDLE TREE, or Staff Tree, the name of a genus of shrubs and small trees, of which about 300 species have been described. common spindle tree is native to Europe, where it is planted for ornamentation in parks and on lawns. The wood is white, has a fine grain, and was formerly used in making spindles and musical instruments. Crayons are made from the charcoal of this tree. A species known as burning bush, so called from its bright red fruit, is native to North America. It is a low shrub, and grows chiefly in moist woods. A woody climber, known as the climbing bittersweet, is one of the species.

SPINNER (spin'ner), Francis Elias, statesman and financier, born in Mohawk, N. Y., Jan. 21, 1802; died in Jacksonville, Fla., Dec. 31, 1890. He was the son of John Peter Spinner (1768-1848), who came from Germany to the United States in 1801. The son was carefully educated and, in 1824, engaged in the confectionery business at Herkimer, N. Y. He was made auditor of the port of New York in 1845 and from 1855 to 1861 served as a Democrat in the United States Congress. In the latter year he was appointed treasurer of the United States, and served in that capacity until 1875. His long service in the treasury caused his peculiar signature, which he cultivated in order to prevent counterfeiting, to become known in all parts of the world, and at the close of his official career the accounts of the office did not show the discrepancy of a penny. He retired from service in 1875, and lived in Jacksonville, Fla., until his death.

SPINNING, the art of combining animal or vegetable fibers so as to form continuous yarn or thread. The methods of spinning differ somewhat, according to the fibers used, which may consist of cotton, flax, jute, silk, or wool. Spinning is an industry that has come down to us from ancient times, and the methods formerly practiced in Egypt are still in vogue in many countries, but they have been replaced largely by modern machinery. The ancients employed the spindle and the distaff, and all the spinning they did was by hand. A quantity of the prepared material was loosely wound upon the distaff, held in the left hand, and the thread was attached to the spindle, which consisted of a tapering piece of wood. The spinster produced a rotary motion of the spindle by a twirl of the hand, and at the same time drew out between the thumb and forefinger of the right hand a supply of the fibers until the motion of the spindle was exhausted. The spindle was drawn in as soon as the movement stopped, when the thread was wound or attached in the same manner, and the process was repeated.

A spinning wheel was invented at Nuremburg, Germany, in 1530, but it was used only for flax spinning. Later it was improved to spin other materials, and may be said to have suggested the spinning jenny invented by James Hargreaves in 1764. The advantage of the spinning jenny was that it employed a number of spindles, while the spinning wheel had only one. However, modern machinery has replaced it, and now many machines of different construction are in extensive use. The spinning machines employed at present are constructed so as to turn out a particular yarn, which permits of greater simplicity than where regulating devices are employed for adjusting so as to finish products of different grades.

SPINNING JENNY, the name of the earliest machine for spinning more than one thread at a time. It was invented by James Hargreaves, in 1764, and soon displaced the spinning frame constructed by Arkwright about the same time. The spinning jenny had a wheel or cylinder to be turned with the right hand, while the left was used to draw out the rovings of the material to be spun, which were twisted as the wheel turned. A piece of wood worked by the toe caused a wire to be let down, and by this means the threads were pressed out and wound upon bobbins. At first the jenny had eight spindles, but later the number was increased from time to time, until as many as 120 were worked on one machine. Samuel Crompton, in 1779, invented the machine that combined the principles of both the frame and the jenny. His invention, known as the mule jenny, superseded all others, and was the first to employ the general principles now employed in all classes of spinning.

SPINNING WHEEL, a machine for spinning fibers into thread. It is an improvement on the ancient spindle and distaff in that the work is done through the agency of a wheel and treadle. This invention, though simple and inexpensive, cannot be traced back farther than 1850. It consists of a frame, in which the spindle is made to revolve by mechanical action, either by the hand or the foot, though the latter is used most extensively. In this machine the spinster guides the wool or other fiber with the hand, and the spindle revolves rapidly through the impulse imparted by a band from the treadle to the wheel. By carefully drawing the thread by means of the hands, it is possible to regulate the degree of fineness as well as its uniformity

SPINOLA (spē'nō-là), Ambrosio, Marquis of, distinguished soldier, born in Genoa, Italy, in 1569; died in Piedmont, Sept. 25, 1630. He descended from a wealthy and noble Italian family, and became distinguished as a military leader of the Spanish forces in the Netherlands, of which he was made chief commander in 1603. The following year he reduced Ostend, which had been besieged unsuccessfully for two years by Archduke Albert of Austria, thus attaining to great renown. Prince Maurice of Orange was his famous opponent, against whom he fought with indecisive results until 1609, when an armistice was concluded. He was sent with a Spanish army into the Palatinate of the Rhine in 1620, where he won a number of important victories, and the following year again invaded the Netherlands. His principal exploits were the capture of Jülich in 1622 and that of Breda in 1625, reducing the latter after a ten months' siege. Subsequently he had command of the Spanish troops in Italy, his death occurring while the siege of Casale in Piedmont was in progress.

SPINOŽA (spĭ-noza), Baruch, best known as Benedict Spinoza, eminent philosopher and author, born in Amsterdam, Holland, Nov. 24, 1632; died Feb. 21, 1677. He was of Jewish parentage, but had the benefit of diligent instruction both in the Bible and the Talmud. His feeble constitution in early life induced him to

pursue the course of a student instead of engaging in commercial enterprises, and a study of sciences and the writings of Descartes caused him to turn from the rigid belief and practices

of the Jews. Saul Levi Morteira, his teacher in Hebrew, was so impressed with his genius as a student that he based the fondest hopes on his future career, but when Spinoza became interested in Latin and philosophic research instead of synagogue practices he was threat-



BARUCH SPINOZA

ened with severe punishment by his teacher. In 1656 he withdrew finally from the Jewish faith and was excommunicated, and, being persecuted by several Jewish fanatics, he left Amsterdam for Rynsburg, and ultimately settled at The Hague, in 1671.

Spinoza had learned the trade of grinding optical lenses, at which he supported himself for some time, but gave devoted attention to sciences and philosophic study. He was offered a professorship at the University of Heidelberg by the elector of the Palatinate, Charles Lewis, with the condition that he should have full liberty of teaching except that he should say nothing against the established religion, but this he declined because of his desire to exercise perfect freedom of thought. Louis XIV. of France made him the offer of a pension, which he likewise refused. Simon de Vries offered to bestow a large sum of money upon him, but he declined to accept more than a moderate sum, sufficient for his support. Thus provided with a small annuity, he gave the later part of his life wholly to scientific research.

The philosophy of Spinoza is based on that of Descartes, and his writings have been widely translated. The first work to appear was his "Ethics," which he published in 1665, concealing both the name of the writer and place of publication. On account of its strong plea for liberty of speech and philosophy, this writing was condemned on the Index of the Catholic authorities and by the States-General of Holland. A translation into the Dutch did not appear until 1693, but it was widely read in the German, and such German writers as Schleiermacher, Goethe, Fichte, Hegel, and Schelling later commended it as a basic work in philosophy. Other writings of Spinoza include "Treatise on Theological Politics," "Abridgment of the Meditation of Descartes," and "Opera Posthuma," the last named appearing in the year of his death. Many treatises on the writings of Spinoza have been

published. At The Hague is a monument to his honor.

SPIRITUALISM (spĭr'ĭt-ū-al-ĭz'm), the term used by philosophical writers to denote the opposite of materialism. When employed in this sense, the term embraces the doctrine that there are spiritual substances, or beings, as distinguished from material, and which are not cognizable by the senses and not revealable through any of the properties of matter. In a specific sense the term is applied to the belief that the spirits of the dead in various ways communicate and manifest their presence to man chiefly through persons called mediums.

The belief that departed spirits have power to communicate with the living has been held for many centuries. However, modern spiritualism dates from 1848, when John D. Fox and his wife claimed to have been disturbed by strange sounds and rappings at the door and different parts of the house. They resided in Hydeville, N. Y., and long attributed the disturbances to natural causes, but at length assumed that the rappings were brought about by reason of spirits of departed persons desiring to communicate with them. Fox and his daughters afterward became mediums and gave seances in many cities of the United States. Spirit circles were organized soon after, and many adherents rapidly joined in the view that it is entirely natural for departed spirits to communicate with the living when the proper conditions are complied with by those in life. A company of mediums visited Europe in 1852, where they attracted considerable attention, and in 1855 D. D. Home made an impressive tour of the European continent. He impressed Napoleon III. very strongly by various manifestations, and made converts among leading scientists and jurists. The manifestations from the spirit world take place at seances, and are in the form of handwritings, rappings, and impressions upon the mind of the medium. In many cases actual frauds have been perpetrated, but manifestations have taken place that have led a large number of people to believe in the existence and activity of the soul apart from the

In 1893 the National Spiritualists' Association was formed in America. The number of spiritualists in the United States and Canada is estimated at 1,700,000. They support ninety auditoriums, have property valued at \$1,750,000, and include 10,650 professional mediums. eighth annual convention was held in 1900. A large number of magazines and other periodicals are devoted to the spread of the doctrine of spiritualism. Much literature has been published on the subject. Spiritualism has developed with equal rapidity in Great Britain, France, and other European countries. Besides those actively affiliating with the spiritualists, there are many who belong to other organizations, but support some of their tenets. A good

instance of this class may be cited in the case of Swedenborg, who alleged open daily communication with the spirit world, and claimed that he had frequent intercourse with spirits and angels.

SPIROMETER (spf-rŏm'é-tēr), an instrument for measuring the capacity of the lungs, especially the volume of air which may be expelled after the deepest possible inspiration. Several devices of this kind are in use. The most common form consists of a vessel with a float set in the top, which it fits closely, and the air is blown through a tube below, causing the float to rise. An index or graduated scale indicates the rise in inches, hence it is possible to determine the number of cubic inches of air exhaled.

SPITHEAD (spit'hed), an anchorage or roadstead off Portsmouth, England, situated in the channel which separates the Isle of Wight from the mainland. It is so named from the Spit, a sand bank, which extends a distance of three miles along the south shore of England. The roadstead is about four miles wide and fourteen miles long, and is a favorite anchorage for the navy of Great Britain. It is strongly fortified, and is known as the King's bedchamber, owing to its security.

chamber, owing to its security.

SPITZ, the name of a small breed of dogs, employed chiefly as a pet. It is about the size of the spaniel, has a pointed face, and is usually white or whitish in color. This class of dogs is sometimes called Pomeranian, owing to its being grown extensively in Pomerania, Germany. It is not serviceable for any kind of work, but some strains are quite beautiful.

SPITZBERGEN (spits-berg'en), an island group in the Arctic Ocean. It consists of three large and several small islands. The area is about 30,000 square miles. Spitzbergen, Barents, and Northeast Land are the chief islands. The group is situated 350 miles east of Greenland and about the same distance north of Norway. The climate is extremely cold, and in the two summer months the thermometer rarely rises more than 35° above zero, though in this short season fully 100 species of plants spring up and ripen their seeds. About 50 of these plants have been described, of which the most vigorous are not over four inches in height. The coast lines are generally icebound on the eastern side, while the western coast is more or less affected by the Gulf Stream. Little is known of the interior, but it is certain that the snow line is only a short distance above the sea level on the interior mountains, which rise to heights of about 4,000 feet. The sun is below the horizon for four months in the winter, from Oct. 22 to Feb. 22, and the longest days are four months. Among the animals native to these islands are several species of bears, foxes, and reindeer. Numerous sea fowls are abundant in the fall season. No permanent settlements exist, but many explorers for northern specimens and

hunters from Norway and Russia frequent the islands, the latter finding considerable profit in pursuing the walrus. The islands were first discovered by Hugh Willoughby, a British navigator, in 1553. They were explored to some extent by the Dutch in 1696. Russia claims the

islands as a dependency.

SPLEEN (splen), or Milt, an organ found only in vertebrate animals. It is situated between the cardiac end of the stomach and the diaphragm. In man the spleen varies more in size and weight than any other organ, though its usual length is about five inches, and its weight three to six ounces. It is a vascular or ductless gland, and the surface is covered with the peritoneum. The color is dusky red. It increases in size after a meal, and in about five hours returns to its normal form. Its functions are believed to be connected with digestion, but its exact purpose is not known. The spleen has been removed from man without causing harmful results.

SPLÜGEN (splü'gen), a pass in the Alps of Europe, leading from the canton of Grisons, in Switzerland, to Lombardy, in Italy. The highest point in the pass has an elevation of 6,946 feet above the sea. In 1834 the government of Austria built three galleries to protect the road

from avalanches.

SPOFFORD (spof'ferd), Ainsworth Rand, public librarian, born in Gilmanton, N. H., Sept. 12, 1825; died Aug. 11, 1908. He received a classical education by private instruction. After establishing a book-selling establishment in Cincinnati, he became an editorial writer on the Cincinnati Daily Commercial, in 1859, and in 1861 was made assistant librarian of Congress. He was appointed chief librarian in 1865, and as such published annually for many years The American Almanac. The library contained about 70,000 volumes when he was put in charge, but within a period of 35 years it was enlarged to over 750,000 volumes, and many manuscripts and pamphlets were added. He published "Library of Choice Literature,"
"Practical Manual of Parliamentary Law,"
"Library of Historic Characters and Noted
Events," and "Library of Wit and Humor."

SPOFFORD, Harriet Elizabeth, authoress, born in Calais, Me., April 3, 1835. She was the daughter of Joseph N. Prescott, and graduated from the Pinkerton Academy, Derry, N. H. In 1865 she married Richard S. Spofford, a cousin of A. R. Spofford. After contributing to the Atlantic Monthly and several other periodicals, she published "Sir Rohan's Ghost," in 1859. Many of her writings have been widely read, and their subjects are usually indicated by the titles. They include "Ballads About Authors," "New England Legends," "Scarlet Poppy," "Art Decoration Applied to Furniture," and "The Servant Girl Question."

SPOKANE (spō-kăn'), a city of Washington, county seat of Spokane County, 450 miles

east of Seattle. It is situated on the Spokane River and the Great Northern, the Northern Pacific, the Oregon Railroad and Navigation Company's line, and other railways. About 25 square miles are included in the tract lying within the city limits, of which the surface is greatly diversified. In the northern part, lying along and north of the river, the surface is gently rolling, but toward the south it includes a hilly and bluffy tract. The river flows in a deep gorge, and has a descent of 142 feet by a series of falls, affording immense water power for manufacturing purposes. Many substantial bridges span the river within the city limits, including those designed for railway, wagon, and street railway traffic.

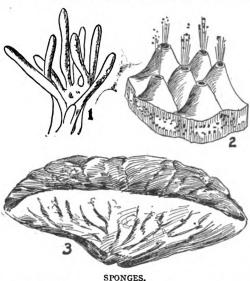
The finest residential section is in the southern part, occupying the summits of a beautiful range of hills, which overlook the city and an extensive region of the surrounding country. As a whole the architecture is modern and substantial, and the streets are finely paved with stone, vitrified brick, and asphalt. Among the larger buildings are the county courthouse, the city hall, the post office, the auditorium, the Review building, the Masonic Temple, the Carnegie public library, and the Spokane and Athletic Club buildings. The ecclesiastical edifices include an Episcopal cathedral and a Roman Catholic cathedral, and several fine structures maintained by the Methodist, Presbyterian, Baptist, and other denominations. It is the seat of Gonzaza College, the Saint Stephen's School for Boys, the Academy of the Holy Name, the Brunot Hall, and many hospitals and charitable institutions. The city has fine ward and high school buildings, all of which carry approved and well-articulated courses.

Spokane is surrounded by a fertile farming and pine-lumbering country. It is important as a wholesaling and a jobbing center and has a large trade in merchandise, live stock, fruits, and manufactures. Lumber products, machinery, flour, furniture, marble and granite products, pottery, brick and terra cotta, clothing and malt liquors are among the leading manufactures. It has extensive systems of waterworks, sewerage, and gas and electric lighting. Intercommunication is provided by a system of electric railways, which has branches to Lake Coeur d'Alene, about thirty miles east, and other ad-

jacent points.

The region was not settled until 1873, when the village was called Spokane Falls. In 1881 the Northern Pacific Railway was completed to the city, which, together with the extensive facilities for water power, caused it to grow rapidly. A fire destroyed a large portion of the buildings in 1889, but it was rebuilt rapidly and soon surpassed its former development in wealth and population. In the five years from 1900 until 1905 it more than doubled in the number of inhabitants. Population, 1905, 73,852; in 1910, 104,402.

SPONGE (spunj), an animal of the group Porifera, having pores in the body wall and being without tentacles. Many species of sponges have been described by naturalists, differing widely in form and structure. Their close resemblance to vegetable forms caused them long to be regarded members of the vegetable kingdom, but their animal nature is evident from internal structure, and from the delicate skin surrounding the body. They are mostly marine. The largest forms are common to the tropical seas, and they gradually decrease in size toward the colder zones. They grow both in deep and shallow water and are fixed in mud or to rocks at the bottom. The body is composed of an internal skeleton, or framework, and a gelatinous substance called flesh. In the skeleton are many pores which open into much-branched canals passing into ciliated chambers, and during life the jelly flesh envelops all internal parts. This fleshy substance resembles a peculiarly formed protoplasm.



1, Branching Sponge; 2, Living Bath Sponge; 3, Bath Sponge.

which, when taken out of the water, has a liver color and becomes sticky. These animals feed upon the minute organisms found in the water, which constantly circulates through the pores, circulation being maintained by cell action. New individuals are produced by internal and external budding and by spermatozoa. Among the species best known are the sheepswool, the yellow, the velvet, the glove, the bath, and the grass sponges.

The skeletons of sponges are the sponges of the market. They are secured by diving. The diver is provided with diving apparatus and loosens the growing sponges by means of an instrument. However, in water less than fifty feet deep the sponges may be secured from a

boat at the surface. One man manages the boat, while another, called the hooker, watches the bottom through a glass-bottomed basket, which is held in one hand, while with the other hand he manipulates a long pole to which is attached a three-pronged hook. When a sponge is found, it is detached from the bottom with the hook and is drawn to the surface. The fresh sponges are killed by more or less prolonged exposure to the air and the fleshy matter is separated from the skeleton by burial in the sand for several days, after which a process of soaking and washing follows. The skeleton becomes a useful commodity for the market and is sold extensively for various purposes.

Among the uses of sponges are those connected with the toilet and bath, washing paint work, stuffing mattresses, and filtering. Valuable sponge fisheries occur in the West Indies, off the coast of Florida, and in the Mediterranean. Those off Florida yield products valued at about \$600,000 annually, representing about 400,000 pounds of dry sponges. The finest sponges come from Smyrna. Those used for washing carriages and horses are obtained chiefly in the Bahamas. The sheepwool is the best grade of sponges and excels in value all others combined. It is sold at wholesale at about \$2.75 per pound, while the grass sponge, a coarse and cheap grade, is sold by fishermen at about 35 cents per pound. Sponge culture has been successfully introduced in several tropical regions. Fossil sponges occur in various strata of limestone, being evidence that this group of animals lived before the oldest

Silurian epoch.

SPONTANEOUS COMBUSTION (spontā'nē-us kom-bus'chun), a term applied to the ignition of mineral and other substances without the application of fire. This phenomenon is frequently the explanation of the origin of fires in machine shops and buildings. Phosphorus in a dry state is liable to ignite spontaneously in a temperature as low as 70°, this being an explanation why ignition often occurs where a large number of lucifer matches are kept in a bulk. Charcoal in a dry state does not undergo spontaneous combustion, but when oils are added it becomes heated and takes fire, while coals associated with pyrites ignite easily in a wet condition. Many instances are on record in which fire generated from placing large quantities of hay in a moist condition into a mow, ignition in such cases resulting from fermentation accompanied by considerable heat. In like manner fire may be caused by the fermentation of rags, tow, cotton, straw, flax, and other vegetable matter. The selfignition of cotton waste used in cleaning machinery has been of quite frequent occurrence, especially where the cotton product was mixed largely with oily substances. Several writers cite cases of spontaneous combustion in the human body, which they allege occurred as a

result of indulging excessively in the use of alcohol. The body being saturated with alcohol, combustion is thought to have taken place spontaneously, but Liebig and other writers assert that such combustion is impossible, and assign the phenomenon as due to bringing a candle or other flame in close contact with the body. It has been observed that combustion in the human body, where it takes place at all, is limited to aged persons and to the very lean or very fat who indulge excessively in the use of alcoholic beverages.

SPONTANEOUS GENERATION, or Abiogenesis, the term applied to the theory that living forms may originate without the intervention of living matter. The question whether under certain conditions living matter is produced by nonliving matter was debated from ancient times until the 17th century, when scientists undertook to disprove it through the use of the microscope, demonstrating the existence of bacteria and other minute organisms that could not be detected with the naked eye. However, interest was stimulated through the theory of infectious diseases and the correlation of forces, and naturalists have been led to bestow more attention upon it than at any previous period.

SPOONBILL, a genus of wading birds of the heron family, having a resemblance to the stork and the ibis. They are so called from



WHITE SPOONBILL

the large size of the bill, which is flattened and widened at the tip. These birds are widely distributed, usually frequenting the mouths of rivers and the seashore, but the species are not numerous. The roseate spoonbill is native to the United States and is found in many sections of the warmer and tropical parts of America, especially in Florida and the Carolinas. The color is almost pure white on the neck, with a rosy tinge on the body, which is about thirty inches long, and the bill attains a length of eight inches. It has an alar extent of fifty inches. This class is usually seen in flocks feeding in wet and marshy places, where these birds catch worms, insects, fish, and small crustaceans. The white spoonbill is native to Europe, moving northward in the spring and to the regions of the Mediterranean on the approach of fall. The color of the body is almost a pure white, but there is a tinge of yellow on the breast, while the bill and legs are black. A kind of sturgeon quite common in the Mississippi and several of its tributaries is known by the name spoonbill. The same name is sometimes given to the shoveler duck.

SPOONER, John Coit, public man, born in Lawrenceburg, Ind., Jan. 6, 1843. His parents removed to Wisconsin in 1859, where he attended public schools, and in 1864 graduated at the university of that State. He served efficiently in the Civil War, at first as a private and subsequently as a captain, and at the close of the war was brevetted major. He was admitted to the bar in 1867 and the following year became assistant State's attorney-general. From 1872 to 1874 he was a member of the State Legislature and in 1885 was elected a Senator of the United States. George W. Peck defeated him for Governor of Wisconsin in 1892, and the following year he began a successful law practice in Madison. He was elected to the United States Senate to succeed Senator Vilas in 1897 and was reelected in 1903. In State politics he was opposed by Governor

La Follette. As a Senator he exercised a wide influence and served on a number of important committees. In 1909 he was succeeded in the Senate by Benjamin F. Shively (born in 1857).

SPOTSWOOD, Alexander, soldier and colonial Governor, born at Tangier, Africa, in 1676; died June 7, 1740. He entered the British army and served with the Duke of Marlborough at Blenheim, where he was wounded. In 1710 he went to Virginia as Lieutenant Governor and was active in promoting William and Mary College. He was removed from office in 1722, but later served as Deputy Postmaster-General. He took an active part in promoting the culti-

vation of tobacco and favored making tobacco notes a medium of exchange. In 1740 he was sent to the West Indies as a major-general. His death occurred at Annapolis, Md.

SPOTTSYLVANIA COURTHOUSE (spŏt-sĭl-vā'nĭ-à), a village in Virginia, about 55 miles west of north of Richmond. It was the scene of a noted battle of the Civil War. This engagement is classed as one of the battles of the Wilderness, which extended from May 5 to June 1, 1864. The Battle of Spottsylvania Courthouse commenced on May 10, 1864, when the Union army under General Grant made

an attack on the Confederates under General Lee, who were intrenched behind their earthworks. The Union army was repulsed with great loss. It was on this occasion that Grant sent his famous message, "I propose to fight it out on this line if it takes all summer," to the Secretary of War. He repeated the assault on the 12th and compelled Lee to withdraw to his inner line of intrenchments, while Grant moved around his left on his way to Richmond, which afterward resulted in the Battle of Cold Harbor.

SPRAGUE (sprāg), William Buell, clergyman and writer, born in Andover, Conn., Oct. 16, 1795; died in Flushing, Long Island, May 7, 1876. After graduating from Yale University, in 1815, he took a course in the Princeton Theological Seminary, and in 1819 became a minister of the Congregational Church. Besides holding a number of important charges, he was pastor at Albany, N. Y., for forty years and subsequently held a pastorate at Flushing. He published a large number of sermons and essays and wrote many biographies and theological treatises. Among his writings are "Life of Timothy Dwight," "Letters from Europe," "Women of the Bible," "Annals of the American Pulpit," and "Lectures on Revivals."

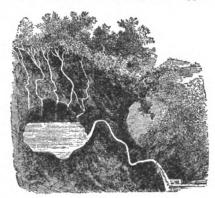
SPRAIN, or Strain, a violent stretching or wrenching of tendons or ligaments of a joint, with or without the rupture of their fibers or the displacement of the bones. Sometimes sprains are as serious and lasting as dislocations, especially if care is not exercised in the use of the part before the swelling and inflammation have fully subsided. Sprains of the back are the most serious, while those of the knee or ankle are quite common and painful. Splints should be worn where the tissues are badly fractured, and cold or hot lotions on the parts are recommended.

SPRAT, or Garvie, the name of a small fish of the herring family, found in large numbers in the Atlantic waters of Europe. It is about six inches long and is frequently canned and sold as a sardine. Sprats are taken in large numbers and are eaten fresh, or may be spiced, dried, or canned. The true sprat is not found in America, but several small fishes common to the southern part of the United States are known by that name.

SPREE (sprā), a river in Germany, which rises in the eastern part of Saxony, near the boundary of Bohemia, and, after a course of 215 miles toward the northwest, enters the Elbe through the Havel River at Spandau. The valley contains righ pasture and agricultural lands and is well wooded. The Spree is navigable for 100 miles. It is connected with the Oder by the Frederick Wilhelm Canal. Among the important cities on its banks are Berlin, Bautzen, Lüben, Spermberg, and Beeskow.

SPRING, a flow of water from the interior

of the earth, caused principally by the water resulting from rain or snow. When rain falls on a porous soil it is rapidly absorbed, and a spring results by the water running along an inclined layer of clay or hard rock until it emerges at some lower level. Springs are caused in some localities by water being forced upward from the reservoirs into which it has collected, principally by the pressure of compressed gas, highly heated steam, or a communicating column of water. In hilly and mountainous regions springs result largely by the water soaking into the porous upper soil



INTERMITTENT SPRING.

and continuing downward until it is intercepted by an impervious stratum, along which it runs until the layer crops out on the hill or mountain slopes. Springs in the region of plains are formed principally by the action of gases or the pressure of other bodies of water.

Springs are commonly divided into variable and intermittent. Variable springs are influenced by the amount of rainfall, varying at different seasons, but they do not cease flowing at any period of the year, while intermittent springs flow only a short time after wet weather, drying on the appearance of the dry season. Artesian, or flowing, wells result when a hole is bored into the earth's crust to form an opening for the escape of water from a reservoir situated on a higher elevation. Hot, or thermal, springs are due to water flowing over a portion of the earth's crust that is highly heated, and geysers result from volcanic action or the pressure of interior gases. Mineral springs occur where the water soaks through or flows over mineral deposits, such as lime, silicon, sulphates, salt, carbonate of iron, and carbonic acid gas.

SPRING, the season of the year that follows winter and precedes summer, so called because it is the time when plants begin to grow in the temperate and colder zones. It begins with the vernal equinox, on March 21, and ends with the summer solstice, on June 21. In North America the spring months are March, April,

and May, while in the Southern Hemisphere, they are September, October, and November. The months of February, March, and April are

the springtime of Great Britain.

SPRINGBOK (spring'bok), a species of antelope, which resembles the gazelles in size and habits. It is native to the open plains of South Africa. This animal is so named from its habit of springing upward when alarmed, or at play, and its flesh is highly prized as a food. It possesses much beauty, having a pure white beneath and markings of white on the head and down the back, while the body is brown. It is larger than the roebuck, and its horns are curved in the form of a lyre. The limbs are long and delicate, and it is able to run with great swiftness. Large numbers congregate in herds as they feed on the plains and hillsides. The springbok may be taken young and tamed, but its largest size and greatest beauty are developed in the native state. The skin is much esteemed for shoes.

SPRINGER, William McKendree, public man, born at New Lebanon, Ind., in 1836; died in 1903. He graduated at the Indiana State University, in 1858, and the following year was admitted to the bar. In 1872 he was elected to the State Legislature of Illinois and was a member of Congress for twenty years, from 1875 until 1895. During this time he rose to prominence as a leader in the Democratic party. President Cleveland appointed him, in 1895, chief justice of the United States court of ap-

peals of Indian Territory.

SPRINGFIELD (spring'feld), the capital of Illinois, county seat of Sangamon County, 185 miles southwest of Chicago. It is situated on the Illinois Central, the Baltimore and Ohio Southwestern, the Wabash, the Chicago and Alton, and other railroads and is surrounded by a productive farming and coal-mining coun-The streets are wide and well paved with brick, asphalt, and macadam. It has intercommunication by an extensive system of electric street railways. Within the heart of the city is the State capitol, which is a fine structure of stone 399 feet long and is crowned by a dome 364 feet high. About a mile from the heart of the city is the monument and mausoleum of Lincoln, in Oak Ridge Cemetery, which contains the remains of the President, his wife, and two children. The old capitol, now the county courthouse, and the residence of Lincoln, are historical buildings. It is the seat of the Lutheran Concordia College, the Bettie Stuart Female Institute, the Saint Agatha's School, and the Academy of Our Lady of the Sacred Heart. Other noteworthy buildings include the post office, the city hall, the public library, the high school, the executive mansion, the Odd Fellows' Building, and a number of fine hotels and hospitals. The city library has 45,500 volumes and there are about 52,500 volumes in the State library.

Springfield is the seat of an extensive trade in farm produce, merchandise, and coal. It has important car shops, woolen mills, and boiler and engine works. The general manufactures include brick and tile, soap, flour, clothing, and machinery. The large works of the Illinois Watch Company are located here. It is the seat of the State fair and the Illinois State Museum of Natural History. The streets are well lighted with gas and electricity and adequate systems of waterworks and sewerage are maintained. In 1819 the first settlement was made in its vicinity, but it was not incorporated as a town until 1832. The State capital was located here in 1837 and it was chartered as a city in 1840. Population, 1910, 51,678.

SPRINGFIELD, a city of Massachusetts,

county seat of Hampden County, 95 miles southwest of Boston, on the Connecticut River and the Boston and Maine, the Boston and Albany, and other railroads. The river is spanned by several bridges. Intercommunication is by an extensive system of electric railways, from which branches extend to many points in the State. In the public park system are 500 acres, but Forest Park, the most important public grounds, includes 464 acres. It is the seat of a United States arsenal, founded in 1795, which is the largest in the country. Many fine memorials decorate the squares and public grounds. These include Saint Gaudens' "The Puritan," the Soldiers' and Sailors' Monument, in Court Square, and the statues of Miles Mor-

gan and President McKinley.

The architecture is largely of brick and stone. Among the principal buildings are the county courthouse, the Christ Episcopal church, the Saint Michael's cathedral, and the Congregational and Unity churches. Other structures include the city hall, the post office, the high school, the International American College, the Union railway station, and the Mercy, Hampden, Wesson, and Springfield hospitals. The public library contains 118,500 volumes, and several fine collections of books are maintained by the private institutions and the public schools.

Springfield has a growing foreign trade and is important as a wholesaling and jobbing center. Large investments are represented by its industries, including about 800 establishments. It has extensive machine shops, paper and flouring mills, tobacco and cigar factories, railway shops, and manufactures of automobiles, rubber goods, cotton and woolen textiles, and machinery. Systems of gas and electric lighting, waterworks, and sanitary sewerage are maintained. The streets are well paved with stone and macadam. About 2,500 men are employed in the manufacture of rifles and small arms by the government. The first settlements in the vicinity of Springfield were made in 1635, when the village was called Agawam. It was burned in 1675 as a result of King Philip's War. Riots occurred during Shay's Rebellion, in 1786. The city was chartered in 1852. Population, 1905, 73,484; in 1910, 88,926.

SPRINGFIELD, a city in Missouri, county seat of Greene County, situated among the Ozark Mountains, 220 miles southwest of Saint Louis. It is on the Kansas City, Clinton and Springfield and the Saint Louis and San Francisco railroads and is surrounded by a region yielding large quantities of lead, zinc, and other minerals. Live stock, cereals, fruits, and grasses are grown in the vicinity. Among the noteworthy buildings are the Drury College, the Loretto Academy, the Saint John's Hospital, the high school, the county courthouse, and a United States government building valued at \$150,000. The city is improved by rapid transit, pavements, waterworks, a sewerage system, and several fine parks. Among the manufactures are machinery, flour, cotton and woolen goods, chemicals, lumber products, engines, and farming implements. It has a growing trade in farm produce and merchandise. Springfield was incorporated in 1838. Population, 1900, 23,267; in 1910, 35,201.

SPRINGFIELD, a city in Ohio, county seat of Clark County, on the Mad River, 80 miles northeast of Cincinnati and 45 miles west of Columbus. It is on the Erie, the Ohio Southwestern, the Pittsburg, Cincinnati, Chicago and Saint Louis, and the Cleveland, Cincinnati, Chicago and Saint Louis railroads. The utilities include gas and electric lighting, public waterworks, sanitary sewerage, and electric street railroads. Among the manufactures are furnaces, boilers, engines, hardware, windmills, farming implements, flour, carriages, linseed oil, sewing machines, iron fencing, and earthenware. The important buildings include the city hall, the Federal government building, the public library, the county courthouse, and numerous fine public schools and churches. It is the seat of Wittenberg Lutheran College, a coeducational institution founded in 1845. Other features include the Y. M. C. A. building, the Snyder Park, the Soldiers' Monument, and the Fern Cliff Cemetery. Springfield is important as a market for merchandise, fruits, and cereals. It was platted in 1801 and incorporated as a city in 1850. Population, 1910, 46,921.

SPRINGHILL, a city of Nova Scotia, in Cumberland County, on the Cumberland Railway and Coal Company's line and the Intercolonial Railway. It is situated on the Maccan River, nine miles south of Amherst, and is surrounded by a productive coal-mining country. The manufactures include leather, packed meat, woolen goods, and machinery. It has a number of fine schools and churches, electric lighting, and a growing trade. Within recent years it has grown rapidly, owing to the development of its extensive coal fields. Population, 1916, 5,865.

SPRING VALLEY, a city of Illinois, in

Bureau County, about 103 miles southwest of Chicago, on the Illinois River and on the Chicago and Northwestern, the Chicago, Rock Island and Pacific, and the Chicago, Burlington and Quincy railroads. The surrounding country produces cereals and fruits and has extensive deposits of bituminous coal. Among the chief buildings are the high school, the public library, and the city hall. It is a market for produce and merchandise. Electric lighting, waterworks, and telephones are among the improvements. Population, 1910, 7,035.

provements. Population, 1910, 7,035.

SPRINGVILLE, a city of Utah, in Utah County, five miles south of Provo City. It is situated near the eastern shore of Utah Lake, on the Rio Grande Western and the San Pedro, Los Angeles and Salt Lake railroads, and is surrounded by a farming and stock-raising country. The industries include a beetsugar factory, machine shops, and flouring mills. It has an academy, several schools and churches, waterworks and electric lighting. The first settlement in its vicinity was made in 1850. Population, 1900, 3,422; in 1910, 3,356.

SPRUCE, the common name for a class of coniferous trees closely allied to the firs and Many species have been enumerated, some of which attain to great heights and yield valuable timber. The black, or double, spruce is native to a region extending from Wisconsin to Maine and thrives as far north in Canada as 65°. In most cases the trunk is straight, often seventy feet high, and it bears a conical head. The wood of this species is very strong and is used in shipbuilding, being alike serviceable for the hull, masts, and spars. The white, or single, spruce thrives farther north than the black and its leaves are somewhat longer. In this species the wood is tough and valuable for construction work. It grows in forests in Wisconsin and several species are native to the Rocky Mountains and California. In some regions the trees are from 80 to 115 feet high. Another species is the hemlock spruce, which attains a height of 125 to 175 feet in the native forests of Northwestern America. Another species, the Douglas spruce, or fir, is found in the western part of North America, extending far north into Canada. The Norway spruce fir is a valuable tree of Northern Europe, especially in Norway, and from it the white or Christiania deal is obtained. Trees 150 feet high are common in its native forests.

SPURGE, a genus of shrubs and trees native to temperate and tropical climates, including about 600 species. The representatives found in the temperate regions are mostly herbs, while those common to the warmer latitudes include many large trees. They have a milky and acrid juice and small flowers, and are leafless or the leaves fall off early. Some closely resemble certain cacti. A number are grown as ornamental plants and for their flowers. About forty species are found in the eastern

part of North America, but some of these have been introduced from Europe and Africa.

SPURGEON (spûr'jun), Charles Haddon, Baptist clergyman, born in Kelvedon, England, June 19, 1834; died in Mentone, France, Jan. 31, 1892. He was the son of a Congregational minister and attended the schools at Colchester and Maidstone. In 1850 he was converted to the Baptist faith and became an active worker in the religious cause, receiving soon after a charge at Waterbeach. He was appointed to preach at a small chapel in London in 1853, but his eminent ability soon made an enlargement necessary, and later he engaged Surrey Music Hall as a place to address his large congregations. In 1861 he promoted the building of the Metropolitan Tabernacle, a structure capable of seating 6,000 persons. His sermons began to be published in 1885, the collection making 2,188 by the end of 1891. He founded a library of 80,000 volumes for indigent ministers, and established a training school for evangelists, besides numerous almshouses, an orphanage, and many chapels. His sermons were delivered with great force and he had them written by a stenographer at the time of delivery. His writings are very numerous and have been widely read. Among the most noteworthy are "John Ploughman's Talk," "Cheque-Book of the Bank of Faith," "Treasury of David," "Gospel of the Kingdom," "Speeches at Home and Abroad," "Types and Emblems," "Storm Signals," and "The Saint and His Saviour."

SPY, the designation applied to a person employed in the time of war to secure information regarding the intent and resources of the enemy, such information being serviceable to the military force or to the nation employing him. The term also has reference to persons engaged for the purpose of keeping officials and various government officers informed regarding probable enemies or opponents, and in this respect the duties of such employees somewhat resemble the work assigned to detectives. Spies were employed for various purposes from remote antiquity, as is evidenced by the circumstance that Moses sent Joshua as a spy to obtain information to be utilized when invading Canaan. The office of a spy is not dishonorable in itself, but the dishonor attached to Major André, Nathan Hale, and other persons acting in the capacity of spies came more largely from their connection with those who had proved traitors to their country, which is frequently the case with those engaging to act in the capacity of spies. It is undoubtedly true that attractiveness is given by the risks accompanying engagements of this kind, especially to persons fond of adventure, but by the laws of war a spy is liable to suffer death.

Many officials and sovereigns employ spies as a means of safety against those liable to attack their person or public institutions. A spy system of this kind is maintained at present by many European monarchs, especially in Russia, where the system is perfect in detail and arrangements. Spies usually dress in the uniform of the enemy and not infrequently in the form of disguise, thus causing the opposing party to be unsuspicious of their intention or designs. They are usually well paid, with the view of insuring loyalty, and are provided with signs and passwords so their identity may be made known to officers of their own country or party. Cooper's "The Spy" is a work of literary value and contains an account of thrilling incidents in the lives of spies.

SQUADRON (skwŏd'rŭn), in military, a body of cavalry, consisting ordinarily of two companies or troops and averaging from 150 to 200 men. The squadron bears the same relation to cavalry that the battalion does to infantry. A detachment of ships of war employed on a particular expedition is usually called a

squadron.

SQUARE, in geometry, a figure formed of four equal sides that meet each other at right angles. Square measure relates to the superficial areas of surfaces in square units, as inches, feet, yards, miles, etc. The square in arithmetic is a number that results from multiplying a number by itself; thus, 81 is the square of 9, for $9 \times 9 = 81$. The number thus multiplied is called the square root, and the method of finding it in algebraic and arithmetical formulas is known as the extraction of the square root. A tool used by carpenters is usually termed a square, consisting of a rule of two limbs united at a right angle. The common rule for finding the square contents of a rectangular figure is to multiply the length by the

SQUASH, the name of several species of plants belonging to the gourd family. They are grown extensively in gardens as a wholesome vegetable for making pies, preserves, and other commodities for table use. The plant is a trailing annual similar to the pumpkin and is planted and cultivated in the same way. Many species have been originated by propagation, but writers generally class them as belonging to four distinct species. Those cultivated include the winter squash, the crook-necked squash, the autumnal, the Yokohama, and the early summer squash. See Gourd.

SQUATTER (skwŏt'ter), an American term applied to one who takes up his residence on a tract of land without due authority, but whose occupancy of the same is not interfered with by the government or the rightful owner. The term squatter sovereignty originated with Stephen A. Douglas, who incorporated it into the Kansas-Nebraska Bill. In this sense it was applied to settlers who entered Kansas for the purpose of aiding in admitting or excluding slavery. Douglas used the phrase popular sovereignty to characterize his plan of leaving it

to the inhabitants of each Territory to decide without the interference of Congress whether it should become a free or a slave State.

SQUID, the name frequently applied to the cuttlefish and to many decapod cephalopods. This class of animals is found in nearly all the seas. The several species are more or less valuable in the industries and as food for fishes and crustaceans. See **Cuttlefish**; **Octopus.**

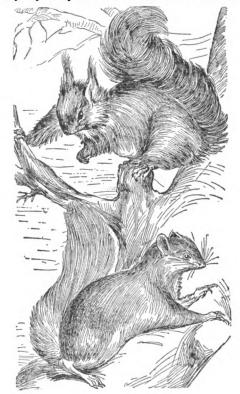
SQUIER (skwir), Ephraim George, explorer and author, born in Bethlehem, N. Y., June 17, 1821; died in Brooklyn, April 17, 1888. He spent his early life on the farm, where he worked in the summer season, and in the winter taught in the rural schools. Later he edited a newspaper and in 1849 became United States commissioner to the republics of Central America. From 1863 to 1864 he was United States commissioner to Peru, where he was sent to examine the Inca architecture, of which he took several photographs. Later he became consul-general at New York under government appointment by Honduras, and while there spent considerable time in preparing his work entitled "Incidents and Explorations in the Land of the Incas." Other publications include "The States of Central America," "Aboriginal Monu-ments of the State of New York," "Scenery and Ancient Monuments," and "Treatise on the An-tiquities of Ohio." The last mentioned was published in the Smithsonian Contribution to Knowledge and resulted from an examination of the antiquities of the Scioto valley.

SQUILL, a genus of plants belonging to the lily family. These plants have a spreading perianth, smooth filaments, and three-seeded cells. They are allied to the hyacinths and many of the species yield beautiful flowers. The most important species is the *sea onion*, which is found on the coast of the Mediterranean. It has a pear-shaped bulb from three to six inches in diameter, which yields medicinal properties useful as an emetic and a purgative. In some cases it is prescribed for treating croup in children and to stimulate the vessels of the lungs.

SQUINTING, or Strabismus, a deformity of the eye, resulting from a want of parallelism between the visual axes. One who suffers with this deformity, though he endeavors to fix both eyes on the same object, is unable to direct them to the same place. The eye directed toward the object looked at is called the fixing eye, while the other is known as the squinting eye. Spasm of the internal straight muscle is sometimes the cause, and in some cases it is due to paralysis. In some instances it is possible to overcome the defect by an operation, which requires making an incision in the mucous membrane and severing the tendon close to the cornea.

SQUIRREL (skwer'rel), a genus of rodent quadrupeds. They are found in all the continents except Australia. Writers have described

many well-marked species, differing widely in size, color, and habits. They are very abundant in the United States and Canada. The squirrels may be divided into the three groups known as tree squirrels, ground squirrels, and flying squirrels. All the squirrels have a more or less slender body, bright eyes, and small, pointed ears. They are graceful and active in their movements. Their hind feet have five toes and their fore feet are four-toed, but the latter have a thumblike projection. They are active and industrious in searching for food, which they lay away for the winter season or for a



TREE SQUIRRELS.

time of scarcity, and their winters are spent mostly in the state of sleep. Tree squirrels are usually of a ruddy-brown color on the upper parts, with a reddish-white below, but their color varies somewhat with the season and climate, usually taking on a grayish appearance in the winter. They live largely in trees, where they may be seen with their large, bushy tail projecting over the back and passing from tree to tree with remarkable skill. Squirrels of this class subsist largely on nuts, seeds, and acorns, and their flesh is highly valued as a food.

The ground squirrels make their home in burrows in the ground. This class includes several species, of which the gray, striped, and red squirrels are the most common in America.

They feed on seeds, tender shoots of plants, and various cereals. In some sections of the country, especially in the central west of the United States, they are a harmful pest to cornfields, often digging the newly planted seed from the ground, which they locate with remarkable skill. Flying squirrels have an extension of the skin connecting their fore and hind limbs, thus forming a sort of parachute, and by aid of this they are able to leap with considerable skill at long distances. In other details they resemble the true squirrels, but differ from the latter in that they roam about at night and are seen less frequently in the daytime. The true squirrels are widely distributed in the forests of North America and most continents and are found only in timbered sections. On the other hand, the ground squirrels are common to many places and frequent both the timber and prairie regions. The flying squirrels are mostly native to Western Asia, but there are species in North America, Siberia, and Eastern Europe. Some species of squirrels yield fur valuable as an article of commerce, especially those of Siberia and other cold regions. See Flying Squirrel.

SQUIRREL MONKEY. See Monkey.

STABAT MATER (sta'bat ma'ter), a celebrated hymn written in the Latin and sung in the Catholic Church during services in passion week. The words stabat mater, meaning the mother stood, are the first words of the hymn, hence its name. A Franciscan monk named Jacopone, or Jacopone Benedetti (died 1306), is supposed to have been the author of the hymn. It was set to music by Haydn, Rossini, and a number of other eminent composers.

STADIUM (stā'dĭ-ŭm), the name of a Grecian course for foot races at the places where games were celebrated, and sometimes in the gymnasia where there were no games. The stadium was an oblong area terminating at one end by a straight line and at the other by a semicircle, and ranges of seats rising above one another in steps were provided at the latter. The celebrated stadium at Olympia was 600 Grecian feet long, equal to 606 feet 9 inches in English measurement. Other stadia were at Athens, Delphi, Epidaurus, and Thebes.

STADTHOLDER (stat'hold-er), the title given by certain provinces of the Netherlands to the chief executives. When Holland and Zealand revolted against Spain, in 1580, William of Orange was made the chief magistrate, or stadtholder. His son, Maurice of Nassau, was declared stadtholder in 1584, at the time the former was assassinated. The dignity continued in the house of Orange. with occasional intermissions, until 1747, when William IV. was declared hereditary stadtholder. In 1814, after the restoration of the Orange family, the title was exchanged for that of king.

STAEL-HOLSTEIN (stä'el-hol'stīn), Maddame de, eminent lady of France, born in Paris, April 22, 1766; died there July 14, 1817. She was the daughter of M. Necker, minister of finance under Louis XVI., and her full name was Anne Louise Germaine Necker. mother was puritanic in discipline, but her father accorded the daughter considerable liberties, and allowed her to converse with the eminent men and philosophers who called at his residence, thus giving her an early acquaintance with public life and thought. Educationally she had everything that could be desired, showing remarkable aptitude for literary study. In 1786 she was married to Baron de Staël-Holstein, then Swedish ambassador to France, but two years later separated from him, However, this marriage brought her in touch with the brilliant society of Paris, of which she became the center of attraction because of her remarkable conversational power and personal enthusiasm. When the Revolution of 1789 began, she exercised considerable political power and made an effort to save the queen, even at the risk of being guillotined herself. In 1792 the reign of terror began and she found safety at Coppet, Switzerland, where she spent some time on her father's estate. The following year she became a refugee in England, where she spent four months in literary research, and while there published "Reflections on the Trial of the Queen."

Madame de Staël-Holstein returned to Paris when affairs came under the control of the directory, and Joseph Bonaparte made a vain effort to induce her to assist in shaping affairs favorably to his brother. Later she exercised her influence in favor of Louis XVIII., but on the return of Napoleon was banished from France, largely because of the circumstance that her home was a common resort of those opposed to his government. She spent her time in exile, mostly in Weimar, Germany, where she formed a friendship with Goethe, Schiller, and Schlegel, and devoted herself to literary work and study. Within that period she published "Influence of the Passions" "Literature Considered in Relation to Social Institutions," two works of much value. In 1804 she visited Italy and was recalled the same year to Coppet, where her father died soon after.

She did not return to France until the restoration of Louis XVIII. At Paris she was received with marked enthusiasm, being accorded a most gracious reception by many men of eminence. Her health soon failed and she sought to restore it by visiting Italy in 1816, but, finding the Italian climate of no material benefit, she returned to Paris and died there the next year. Her will revealed a secret marriage to a French officer named M. de Rocca, who was 21 years her junior. Madame de Staël-Holstein ranks among the most eminent female writers of her period, possessing remarkable originality, enthusiasm, and depth of

tender sentiment. Among her works not mentioned above are "Letters to Rousseau," "Reflections on the Peace," "Considerations Upon the French Revolution," "Life of M. Necker," "Ten Years of Exile," and two tragedies entitled "Lady Jane Grey" and "Josephine."

STAFF, in military science, a corps of officers attached to a commander for the purpose of aiding him in executing his designs. Officers of this class are usually divided into general staff officers, staff corps, and the regimental staff. The general staff consists of adjutants general and assistant adjutants general, inspectors general and assistant inspectors general, aids-de-camp, etc., whose duties include the communication of the orders of the general in chief as well as the whole range of the service. Staff corps are confined to distinct branches of the service and include such officers as the engineers, topographical engineers, and officials having charge of ordnance, subsistence, medical service, and pay departments.- The regimental staff includes regimental officers and certain noncommissioned officers, and their duties are similar to those of adjutants general, commissaries, and quartermasters. Schools are maintained in many countries for the special instruction of staff officers. They are required to know the country thoroughly, to superintend the transmission of orders promptly, and to discharge complicated duties intelligibly.

STAG, or Red Deer, a species of large deer native to the northern sections of Europe and Asia. The male, or hart, has round, branching horns. They are shed annually and reach their largest size in the seventh year. The female, or hind, is hornless and smaller than the male. These animals have a grayish-brown color in the winter and a reddish-brown in the summer, and are classed among the handsomest of the deer family. They have an acute sense of smell and are strong, swift, and watchful. The pairing season occurs regularly in August and the young, or calf, is born in May. Formerly these animals were seen in large numbers in Western Europe and they are still found in protected regions, especially in Germany, Austria, and Russia. A class of deer known as the wapiti is nearly allied to the red deer of Europe, but is native to North America. Similar species occur in Northern Africa. See Deer.

STAG BEETLE, the common name applied to a large group of insects, including about 550 species. Many of these beetles are of considerable size and receive their name from the large and powerful mandibles of the males. The common stag beetle of Europe is about two inches long, exclusive of the mandibles, and has a black or dark brown color. During the day it lives in the trunk of trees, but flies about freely at night, often entering houses and other places where lights are burning. A species called the horned bug is common to the eastern

part of North America, particularly New Brunswick and New England, and has a mahogany-brown color. It has spread westward and is frequently seen in the evening, especially in the branches of apple, willow, and oak trees.

STAGHOUND, a large dog used formerly for hunting the stag in Europe, whence the name. It is somewhat heavier than the grey-hound, has rough fur, and is noted for its strength and swiftness. The scent is developed almost as highly as in the bloodhound, with which it is frequently crossbred.

STAINED GLASS. See Glass. STAINER (stā'nēr), Sir John, composer, born in London, England, June 6, 1840; died March 31, 1901. At the age of seven years he began to sing in the choir of Saint Paul's Cathedral, but gave up singing in 1856, owing to a weakening of his voice. In 1889 he became professor of music in Oxford University and was knighted. Many musical associations and institutions of learning bestowed honors and degrees upon him. He was made a chevalier of the Legion of Honor in 1878. His compositions include "The Crucifixion," "Saint Mary Magdalene," and the "Daughter of Jairus."

STALACTITE (stà-lăk'tīt), the name given to masses of rock resembling icicles in form, which are found attached to the roofs in many caverns. They are caused by the evaporation of water impregnated with minerals, such as lime, pyrites, limonite, and chalcedony. The water laden with minerals of this class penetrates the rock, and the substances solidify as the liquid evaporates. In some instances the stalactites form columns from the roof to the floor, and in such cases the forms resemble curtains, waterfalls, and other phenomena. Sometimes stalagmites are formed, being produced by successive drops of water falling upon the floor, the growth in such cases being upward as the liquid evaporates.

STAMEN (sta'men), that part of flowers which contains the pollen, or male fertilizing element. It consists of a filament, an anther, and the pollen. The filament is the tender stalk, or support, and attached to it is the anther, which forms a double-celled sac containing the pollen. When the anther and pollen are wanting, the stamen is said to be sterile and abortive. The pistil is the female part and normally occupies the center of the flower. It is composed of the ovary, with its ovules and Fertilization takes place when the pollen comes in contact with the pistil. These two essential parts are often in different flowers of the plant and sometimes on distinct plants of the same species.

STAMFORD (stăm'ferd), a city of Connecticut, in Fairfield County, on Long Island Sound, 32 miles northeast of New York City. It is on the New York, New Haven and Hartford Railroad and has steamboat connections with New

York and other cities. Stamford is surrounded by a fertile agricultural and fruit-growing country. The notable buildings include the Ferguson Library, the Saint John's Hospital, the Stamford Hospital, the high school, the Betts Academy for boys, the Catherine Aiken School for girls, and many churches. It has manufactures of iron and bronze wares, drugs, yale locks, musical instruments, boots and shoes, stoneware, and machinery. It is a favorite summer residence and resort. The place was settled in 1641 and incorporated as a city in 1893. Pop-

ulation, 1900, 15,997; in 1910, 25,138.

STAMP, a small piece of paper issued by the government and sold to the public to be attached to letters, documents, and packages liable to the payment of duty. Stamps for the payment of postage on letters and small parcels came into use in England in 1840, where their adoption was suggested by Sir Rowland Hill, and they were generally adopted in the United States in 1847. Each nation now has a system of stamps for its mail service, on which the portrait of some distinguished public man or an ensign is printed, together with the denomination of the stamp. The different stamps used in a nation at the same time vary in number from 75 to 200, this being required to supply various denominations and stamps for different purposes. The first stamp issued in the United States was of the denomination of five cents and bore the portrait of Benjamin Franklin. Fully 125 different stamps have been in use at one time in that country.

Revenue stamps are those issued by the government to be attached to documents liable to duty. The revenue stamp system is a form of taxation, designed in the United States as a war measure to provide revenue for the govern-Such a law was enacted at various The revenue stamp law passed at the times. time of the Civil War was not wholly repealed until 1883, when the last articles required to be stamped, including bank drafts, checks, and matches, were made exempt. This law yielded \$16,500,000 in 1870. Another law of this kind was enacted soon after the beginning of the Spanish-American War, but it was repealed in part by an act of Congress passed March 2, 1901. The revenue law of 1917 requires stamps to be affixed to deeds, notes and many other documents. The thrift stamps, authorized the same year, induced many people to save their earnings by investing them in government securities. Excise taxes, such as those on cigars and alcoholic beverages, also are covered by stamps.

STAMP ACT, a revenue law passed by the British Parliament in 1765. It required that all paper, vellum, and parchment used in the American colonies should be stamped, and declared null and void all legal documents written on unstamped paper. The measure was proposed by

George Granville, Chancellor of the English Exchequer, as a means to raise revenue. This aroused such violent opposition in America that all the colonies except Virginia, New Hampshire, Georgia, and North Carolina sent delegates to a congress at New York, which remained in session from the 7th until the 25th of October, 1765. This congress addressed a protest to the king and declared that the colonies could be taxed only by their own representatives in the colonial assemblies. The English looked on the declaration as that of an unconstitutional gathering, but continued opposition finally caused the repeal of the Stamp Act in 1766. This legislation for raising revenue is one of the causes that led to the Revolution.

STANBERY, Henry, lawyer and jurist, born in New York City, Feb. 20, 1803; died June 26, 1881. He studied at Washington College, Pennsylvania, where he graduated in 1819, and was admitted to the bar in 1824. Soon after he removed to Ohio, where he practiced law and was attorney-general of the State. President Johnson appointed him Attorney-General of the United States, which office he held until 1868, when he resigned to become counsel in the impeachment proceedings for the President. Subsequently he practiced his profession in Cincinnati.

STANDARD TIME, a general system of reckoning time, with the Greenwich meridian as a basis, and adopted by all the principal railroad companies in Canada and the United States. It went into general effect at twelve o'clock, noon, Nov. 18, 1883. The system originated with Professor Abbe, of the signal bureau at Washington, D. C. It divides the continent into four longitudinal belts and fixes a meridian of time for each belt. These meridians are 15° of longitude from each other, thus corresponding to one hour of time, and the time of the four sections is known as Eastern, Central, Mountain, and Pacific.

Eastern time is used in the United States in the territory lying between the Atlantic coast and a line drawn from Detroit, Mich., to Charleston, S. C. Central time extends from this line to a line drawn from Bismarck, N. D., to the mouth of the Rio Grande. Mountain time includes the region lying between the western limit of Central time and the western borders of Arizona, Utah, and Idaho, and the remainder of the country is within the sphere of Pacific time. The lines bounding the different divisions are necessarily irregular, since it is aimed to change the time on trains at important railroad centers. However, Canada has five divisions of standard time, instead of four divisions, including, besides those named for the United States, the Atlantic time. It is well illustrated on the Canadian Pacific, on which it is Atlantic time east of Vanceboro; Eastern time from Vanceboro to Fort William. Sault Sainte Marie, and Detroit; Central time west from Sault Sainte Marie and Fort Williams to Broadview; Mountain time from Broadview to Laggan; and Pacific time from Laggan to Vancouver and Victoria.

According to this system of reckoning, places lying within Eastern time have twelve o'clock, noon, when those in Central time have 11 a. m.; those in Mountain time, 10 a. m.; and those in Pacific time, 9 a. m. A traveler passing from one time belt to another finds his watch too fast or too slow, according to the direction in which he is going. All points in any time division using the time of the meridian have their time pieces faster or slower than the time indicated by the sun, according as their time is east or west of the line. The naval observatory

eleven o'clock a. m.; in Denver for 10 a. m.; and in San Francisco for 9 a. m. The company provides an electro-magnet to be attached to clocks, and by means of this instrument the hands on the dials are forced to the exact hour in all parts of the United States where connections are maintained. The charge for such connection is \$15 per year, and from this source the company receives over a million dollars annually. Standard time has proven a great convenience in railroading and to the traveling public, since the objections to keeping 53 standards of time by railroad companies have been overcome, and the standards are now equal in number to the four regularly recognized time helts

STANDISH (stănd'ish), Miles, colonist and



STANDARD TIME IN CANADA AND THE UNITED STATES.

at Washington supplies the standard time in the United States. The exact hour of twelve o'clock, noon, is determined every day by astronomical examination, the chronometer of the observatory is corrected, and the correct time is communicated to all the government departments by electricity at the precise hour. Connected instruments are kept in the room of the Western Union Telegraph Company, which telegraphs the time automatically to all parts of the United States, reaching San Francisco in one-fifth of a second. To accomplish this effectually, all business is taken off the wires three minutes before noon each day, thus supplying an unbroken connection between Washington and every point on its lines.

It must be remembered that the noon signal at Washington indicates time in Chicago for

soldier, born in Duxbury, England, about 1584; died in Duxbury, Mass., Oct. 3, 1656. He entered the British army for service in the Netherlands and attained to the rank of captain. In 1620 he sailed for America with the pilgrims on board the Mayflower and, after landing at Cape Cod. conducted an exploring expedition to discover a suitable place for the settlement. After founding Plymouth, the colony chose him as captain to command an expedition against the savages, thus making him the first military officer in New England. He visited England in 1625 as agent for the colony and the following year returned with supplies. In 1632 he founded Duxbury and was for many years a member of the executive council and treasurer of the colony. A fine monument 100 feet high has been built to his memory at Duxbury and at its top

is a statue. His courtship of Priscilla Mullins was commemorated by Longfellow in "The Courtship of Miles Standish."

STANFIELD (stăn'fēld), Clarkson, eminent painter, born in Sunderland, England, in 1793; died at Hempstead, May 18, 1867. He descended from Irish parentage and at an early ago entered the navy, making frequent voyages to China and other countries in the East. Considerable skill in drawing and painting was developed while in the naval service and, after receiving an injury from a severe fall, he left the navy and engaged in painting theatrical scenes. In 1826 he exhibited a fine picture entitled "Market Boats on the Scheldt" and soon after produced other paintings of merit. He was made an associate of the Royal Academy in 1832 and in 1835 became a full academician. Among his most celebrated paintings are "The Battle of Trafalgar." "French Troops Fording the Margra," "Victory," "Wreck of a Dutch East Indiaman," and "The Bass Rock."

STANFORD (stăn'ferd), Leland, public man and philanthropist, born in Watervliet, N. Y., March 9, 1824; died in Palo Alto, Cal., June 21, 1893. After receiving a public school education, he studied law and was admitted to the New York bar in 1849. In the same year he went to California overland to seek his fortune, and, after engaging in gold mining, he settled in business in San Francisco in 1856. He was a promoter of the Central Pacific Railroad and as president of the company superintended its construction. In 1861 he was elected Governor of California as a Republican, and from 1884 until the time of his death served in the United States Senate. His fortune was valued at \$50,000,000. He gave \$20,000,000 to found the Leland Stanford Junior University at Palo Alto in memory of his son, which institution has courses covering all the important branches of education. His widow, Jane Stanford, died Feb. 28, 1905.

STANHOPE (stăn'ŭp), Lady Hester Lucy, public benefactress, born in Kent, England, March 12, 1776; died June 23, 1839. She was the eldest daughter of the third Earl of Stanhope (1753-1816). Her father was an inventor and scientist and a friend of popular government. She lived with her uncle, William Pitt, for three years, of whose household she was manager, and at his death was granted a pension by the King of England. In 1810 she left England to search for a home in Palestine and, after extensive travels through the East, finally settled on Mount Lebanon. She became a Mohammedan in religion and custom, and from her seat of influence wielded almost absolute authority over the surrounding district. Albanian natives fortified and garrisoned the convent that she made her home, which became the refuge of many in need and distress, especially a large number of refugees after the siege of Acre. She came to actual financial straits because of her

liberality, but was supported by her Mohammedan friends, who regarded her a prophetess Several interesting accounts of her life in the East have been published by travelers.

STANHOPE, Philip Henry, Earl, statesman and historian, born in Walmer, England, Jan. 31, 1805; died at Bournemouth, Dec. 24, 1875. In 1827 he graduated from Oxford and three years later entered the House of Commons, v.here he became a potent and influential factor. He was a strong advocate of the copyright law passed in 1842, and from 1845 to 1846 served as Secretary of the Indian Board of Control. In politics a Conservative, he was an intimate friend of Robert Peel and was made an earl in 1855. His numerous writings include "Memoirs of Sir Robert Peel," "History of England from the Peace of Utrecht to the Peace of Versailles," "War of the Succession in Spain," "Life of Louis, Prince of Condé," and "History of Spain under Charles II." He was one of the founders of the National Portrait Gallery.

STANISLAS I. LESZCZYŃSKI is-las lyesh-chin'y'skt), King of Poland, born at Lemberg, Galicia, Oct. 20, 1677; died Feb. 23, 1766. He descended from a wealthy and noble Polish family and was made palatine of Posen. In 1704 he was made King of Poland, being supported by the King of Sweden. He lost the throne in 1709 as a result of the Battle of Poltava, at which Charles XII. of Sweden was defeated by Peter the Great, who restored Augustus to the throne of Poland. In 1725 his daughter Maria married Louis XV. of France and he was restored to the Polish throne in 1732, but was again dispossessed by the Treaty of Vienna in 1735, who recognized Augustus III. as King of Poland. Subsequently Stanislas received the duchies of Bar and Lorraine and maintained courts at Lunéville and Nancy, where he encouraged learning and gathered about him men of science.

STANISLAS II. AUGUSTUS, King of Poland, born at Wolczyn, in Lithuania, in 1732; died in 1798. He was elected to the Diet of Poland, in 1752, and subsequently represented that country at the court of Russia, where he gained the favor of Catharine. In 1763, on the death of Augustus III., he was a candidate for the throne of Poland, to which he was elected the following year. His administration was unsuccessful through the disagreement of the nobles, and his country was thrown into a condition of anarchy. In 1795 he resigned the crown, his kingdom having been partitioned by Austria, Prussia, and Russia.

STANLEY (stăn'li), Arthur Penrhyn, eminent scholar and divine of the Anglican Church, born in Cheshire, England, Dec. 13, 1815; died at Westminster, July 18, 1881. He was the schof Edward Stanley (1779-1849), the rector of Alderley, and studied under Dr. Arnold at Rugby. In 1834 he was admitted to Oxford University, where he became a fellow, and was

admitted to holy orders in 1839. The following year he made a prolonged tour in Italy, Greece, and Asia Minor, and in 1841 settled at Oxford, where he served as tutor of Balliol College for ten years. He became canon of Canterbury in 1851, was made professor of ecclesiastical history and canon of Christ Church in 1856, and became dean of Westminster in 1863. Stanley was liberal as a theologian, considering the prevailing spirit of his time, and frequently invited clergymen of the Scottish and other churches to address his congregation. In many instances he held union meetings. His work entitled "Sinai and Palestine" is the result of an extended tour through Egypt and Palestine in 1852 and 1853, and his "Eastern Church" was written after traveling through Russia in 1857. Other writings include "Essays on Church and State," "Life of Arnold," "Memoir of Bishop Stanley," "Historical Memoirs of Westminster Abbey," "Three Irish Churches," "Christian Institutions," "Lectures on the Church of Scotland," and "Memorials of Canterbury." He was buried at Westminster, in the chapel of Henry VII.

STANLEY, Sir Henry Morton, eminent explorer, born in Denbigh, Wales, in 1841; died May 9, 1904. He was born in poor circumstances



HENRY MORTON STANLEY.

and at the age of three years was placed in the poorhouse of Saint Asaph. His early name was John Rollands, by which he was known until he worked his way as a cabin boy to New Orleans, in 1855, when he was adopted by a merchant

and took the name of his benefactor. His foster father died soon after and he entered the Confederate army, serving in several engagements, but, after being captured by the Union army, entered the United States navy as a volunteer. He was assigned to the ironclad Ticonderoga and left the service at the close of the war as an ensign. Soon after the war he engaged as correspondent of the New York Herald, which paper sent him to Turkey in 1866 to report upon the Cretan revolution, and subsequently he traveled extensively in the Levant. In 1868 he joined the expedition against Abyssinia under General Napier, and while reporting secured distinction by getting his account of the Battle of Magdala to London before the official dispatches reached there. In the later part of the same year he proceeded to Spain to report the revolution against Queen Isabella, and while there received word from the New York Herald "to go and find Livingstone."

Stanley started overland from the Crimea to Bombay, visiting and reporting different parts of Palestine, Persia, Burmah, and the opening of the Suez Canal, and in January, 1871, reached Zanzibar. Shortly after he entered upon his famous expedition into the heart of the unexplored region, taking with him a band of experienced natives and extensive equipments for a prolonged journey. His force consisted of 200 men and the journey occupied 234 days, being delayed somewhat on account of sickness and native hostilities. He found Livingstone at Ujiji, on Lake Tanganyika, in November, 1871, and the two men spent four months in exploring the great lakes sufficiently to prove that Lake Tanganyika has no connection with the Nile but belongs to the Congo basin. In 1872 he returned to England, where he received royal honors and published "How I Found Livingstone," a work that proved highly profitable. The New York Herald employed him to report the Ashanti campaign soon after, and he returned to England at an opportune time to witness the burial of Livingstone in Westminster Abbey.

Stanley organized a second expedition to penetrate Africa in 1874, under the joint direction of the New York Herald and the London Daily Telegraph. Leaving England in August, 1874, he arrived at Zanzibar in the later part of that year and early in 1875 reached Victoria Nyanza. His company consisted of 350 men, but one-third of these died while on the march to Lake Victoria. After exploring lakes Victoria and Albert Nyanza, proving the latter to be a tributary of the Nile, he proceeded across the continent of Africa and reached the mouth of the Congo in 1877. He now sailed from the mouth of the Congo to Zanzibar, where he dismissed the surviving members of his company and in 1878 reached London. The founding of the Congo Free State is a direct result of this expedition, although it was established under the protectorate of Leopold II. of Belgium. Stanley was engaged soon after to explore and establish stations in that region, where he spent the four years between 1879 and 1884 and in the latter year returned to the United States. He entered upon the famous expedition to relieve Emin Pasha in 1887. While this enterprise was heralded to be in the interest of humanity, it was in fact to lessen German influence in equatorial Africa and extend the authority of Great Britain, though it is thought Stanley was not fully aware of the intent of those who promoted it.

Leaving Zanzibar in the spring of 1887 with 700 men, he proceeded to the mouth of the Congo River by way of the Cape of Good Hope, and thence followed that stream to the mouth of the Aruwimi River. After passing through a trackless forest and discovering the Ruwenzori Mountains, he finally arrived at the banks of Lake Albert Nyanza in January, 1889, and in

December of the same year Emin Pasha and Stanley reached Bagamayo. On returning to England, in 1890, he married Dorothy Tennant, made a lecturing tour in the United States, and subsequently became a naturalized citizen of England. In 1895 he was elected to Parliament as a Unionist candidate and received a degree from Oxford. His writings include "In Darkest Africa," "Through the Dark Continent," "Slavery and the Slave Trade in Africa," "Congo and the Founding of the Free State," and "My Dark Companions and Their Strange Stories."

STANOVOI (stä-nô-voi'), a range of mountains in the northeastern part of Asia, situated in Eastern Siberia. It extends from the border of Mongolia, southeast of Lake Baikal, in a northeasterly direction to Bering Strait. On the frontier of China it merges with the Altai Range to form the Yablonoi Mountains. Several spurs run from the main range, including one that extends to the Sea of Japan and another that runs parallel with the Lena River almost to the Arctic Ocean. The culminating peak is Mount Tehokhondo, or Sokhondo, in the southern part, which has an altitude of 8,150 feet. The range has a length of 3,000 miles and the general elevation does not exceed 3,250 feet. Fine forests of valuable timber cover many of the slopes in the southern part, but the extreme northern extension is entirely barren or is characterized by a small growth of shrubs.

STANTON (stăn'tun), Edwin McMasters,

statesman, born in Steubenville, Ohio, Dec. 19, 1814: died Dec. 20, 1869. After graduating from Kenyon College at Gambier, Ohio, he studied law and in 1836 was admitted to the bar. He first practiced law at Cadiz and later at Steubenville, and soon after was appointed reporter of the supreme court of Ohio. In 1848 he located in Pittsburg to practice law, and in 1859 removed his office to Washington. President Buchanan appointed him Attorney-General of the United States to succeed Jeremiah S. Black, the latter having been promoted to the position of Secretary of State. This period was one of intense excitement, owing to the withdrawal of the United States troops from Charleston harbor, and at the accession of President Lincoln he resumed the practice of law. When Simon Cameron resigned as Secretary of War to accept the mission to Russia, Lincoln selected him as war secretary. His administration of that de-

partment was very energetic and, when Johnson

succeeded to the Presidency, serious difficulties

arose, which finally caused his suspension in

1867. Congress restored him in 1868 and the

House of Representatives impeached the Presi-

dent, but Stanton resigned in the same year, re-

ceiving from Congress a vote of thanks for

Grant appointed him a justice of the Supreme Court, but he died before entering upon the

duties of that office. His son, Louis M. Stanton,

published "Memoir of Edwin M. Stanton."

President

faithfulness and efficient services.

STANTON, Elizabeth Cady, reform advocate, born in Johnstown, N. Y., Nov. 12, 1815; died Oct. 27, 1902. She was the daughter of Daniel Cady. The inequality of women in matters of law and politics first came to her notice while in the office of her father. In 1840 she was married to H. B. Stanton, and in 1848 joined Lucretia Mott (1793-1880) in organizing the first woman's convention at Seneca Falls, N. Y. Subsequently she became noted as an able advocate of woman's rights, lecturing and writing extensively on that subject. In 1888 she served as president of the International Council of Women. She joined Susan B. Anthony and Matilda J. Gage in publishing "History of Wom-Her husband, Henry Brewster an's Suffrage." Stanton (1805-1887), was an able journalist and public man. He first served as writer for the Rochester Monroe Telegraph, joined the antislavery movement, and in 1840 attended the antislavery meeting in London. Soon after returning to the United States he became editor of the New York Sun. He published "Sketches of Reforms and Reformers in Great Britain and Ireland."

STARCH, an important principle of plants, which occurs in greater or less quantity in the seeds, pith, and tubers of all plants except the fungi. It is especially abundant in the tubers of the potato and in the seeds of cereal plants, as in corn. Starch abounds in the interior of many plants, as that of the sago, and in the barks and fruits, as in the bark of cinnamon and in apples. It is formed of small grains or granules, which differ in size and appearance according to the source, thus making it possible to distinguish the various kinds sold in the trade. In a pure state it consists of a snow-white powder and, when pressed with the fingers in a dry state, it causes a slight crackling noise.

Starch is insoluble in water and alcohol, but, when it is rubbed with water in a mortar with rough sides, a small portion of the interior of the granules appears to dissolve. When it is boiled with a large quantity of water, the granules burst and a turbid liquid is obtained on cooling; this contains some soluble starch and holds in suspension the insoluble portion. It forms a gelatinous mass, called starch paste, when heated with water to about 150°. Dextrine is made by heating starch to about 120°. It is soluble in water, has a pale yellow color, and is the gummy substance used on postage stamps and as a mucilage. Sugar results when starch is boiled in a diluted form of sulphuric acid.

Starch is the substance that makes the grains of cereals and the seeds of many plants nutritive. Vegetables, herbs, and greens are constituted largely of cellulose, which is chemically allied to the starches, but it affords little or no nutriment. It is useful in distending the alimentary canal, thus giving the digestive juices a greater action on the starches. Human saliva, malt, and dilute acids convert the starch into

grape sugar or glucose, under conditions of warmth and moisture. Rice contains 75 per cent. of starch; corn, 56 per cent.; wheat, 54.7 per cent.; barley, 46.3 per cent.; rye, 45 per cent.; beans, 37.7 per cent.; oats, 36.5 per cent.; and potatoes, 18.5 per cent. Thousands of tons of starch are converted annually into glucose and dextrine by treatment with heat and mineral acids. Cornstarch is made from corn, which is first cleaned and soaked in water for three days. The soft and pulpy grains are then pulverized in a grinding mill and the pulverized mass is strained through sieves, this serving to separate the husks and germs of the corn from the starch. The starch is allowed to settle in vats filled with water, after which the water is run off, and the starch is washed repeatedly to separate from it the gluten and other foreign substances. It is next bleached and dried, and soon after it is prepared in convenient packages for the market.

Wheat starch is made in a similar way and its higher cost causes its use to be confined to fine laundry work. Potato starch is obtained by crushing or grinding the potatoes, then washing the mass thoroughly, separating the foreign substances, and finally placing it in the dry room. Several hundred starch factories are operated successfully in the United States, the most important being at Oswego, N. Y., and Glen Cove, Long Island. Cornstarch is manufactured the most extensively, and, besides being a wholesome food, it is used for various purposes in manufactures, especially in making calico and other textiles, mu-

cilage, and glucose. Large quantities are consumed for laundry purposes. The liver of all healthy vertebrate animals contains animal starch, which is called *glycogen* from its property of being converted into *starch sugar*, or *glucose*. It has some resemblance to vegetable starch.

STAR CHAMBER, an English court of civil and criminal jurisdiction at Westminster, so named from the gilt-star decorations of the ceiling of the room in which it was held. This court was founded by Henry VII., in 1487, and consisted of four high officers of state, with power to add to their number a bishop and temporal lord of the council, and two justices of the court of Westminster. Its jurisdiction extended to cases of riot, perjury, forgery, conspiracy, libel, and other misdemeanors of public importance. Trials were conducted by a method of questioning, but the accused was given the right to confess. The latter practice developed into widespread abuse, torture being employed to extort confessions, and Parliament accordingly abolished it in 1641. This court had the power to inflict any punishment aside from death.

STARFISH, a class of marine animals, which have a starlike body composed of a central disc extending into five or more rays. They belong to the radiates, a class of animals having a cen-

tral focus with raylike projections and the body covered with a leathery skin. The mouth is in the center, at the under side, and from it is an opening into the stomach, which extends by two branches into each ray. Movement is effected by peculiarly formed tubular feet, which are protruded against the bottom, where they crawl in search of food. At the end of each ray is a reddish speck, which constitutes the eye, but its sensitiveness to light is not highly developed. Reproduction is by eggs, vast numbers being laid in the spawning season. Starfishes are very greedy eaters and in many places prove a pest by devouring the bait of fishermen. They are found widely distributed in tropical seas, assuming smaller forms toward the colder waters, and extend in the Atlantic from Mexico to Greenland. They vary in diameter from one to fifteen inches. Fossil starfishes occur as early as the lowest Silurian epoch, whence they continue to the present time.



STARFISH.

STARK, John, noted general, born in Londonderry, N. H., Aug. 28, 1728; died in Manchester, N. H., May 8, 1822. He descended from a pioneer family and his early life was spent in the frontier region of New Hampshire. The Indians captured him when yet a youth and adopted him into the Saint Francis tribe. In the French and Indian War, in 1858 and 1859, he served as captain, and at the beginning of the Revolution raised recruits to assist the colonies. After serving with ability at the Battle of Bunker Hill, he led a colonial force into Canada, and subsequently served at Trenton, Princeton, and Bennington. The Continental Congress promoted him to the rank of brigadier general after the last mentioned battle, and in the latter part of 1777 he resigned his command. When Burgoyne's invasion called out the New Hampshire militia, the soldiers demanded him as a commander, and he prevented that general's retreat from Saratoga. Later he served in Rhode Island and New Jersey, and in 1781 was made commander of the northern department. "The enemy must be beaten, or Molly Stark will be a widow, is an expression made by him at the Battle of Bennington. After the war he lived in retirement and was the last surviving general of the Revolution except Sumter.

STARLING (stär'ling), a genus of birds allied to the crow family. They occur in Europe, Asia, and North Africa. The bill of the common European starling is long and pointed, the color is blackish with shadings of green and purple, and at the extremity of the feathers is a whitish speck. The female has less beautiful plumage than the male, and both sexes are more speckled in winter than in summer. This species is found in all parts of Europe, except the extreme north,



EUROPEAN STARLING.

and in most parts of Asia and Africa. The nest is built of twigs and grass, usually in hollow trees and old walls. Several species build in boxes provided for them near houses. They can be taught to speak some words and whistle tunes when confined in a cage. The meadow lark (q. v.) of North America is an allied bird, but is larger than the European starling.

STAR OF BETHLEHEM, a bulbous rooted plant of the lily family, resembling the hyacinth. The leaves are narrow and the flowers are variously colored, usually white or yellow, and are quite fragrant. Many species have been described, some being extensively cultivated in flower gardens. Those best known are native to France, Switzerland, and Germany. Several species are indigenous to Asia and Africa. The flowers open at eleven o'clock in the forenoon and close at three in the afternoon. From this circumstance they are sometimes called Johnnygo-to-bed.

STAR ROUTE, the name given in the United States to the postal lines over which the mail cannot be carried by railroad or steamboat and, instead, is conveyed by stage or on horseback. They are so named because in the route book of the Post Office Department they are marked with a star (*). Routes of this kind are very numerous in the mountains and in sparsely settled districts, but short distances are covered by the mail service in this way even in densely populated districts. In 1881, during the administration of President Hayes, certain frauds, known as the Star Route Frauds, were discovered and exposed in connection with this service by the government. Those interested in these frauds had increased the compensation for carrying the mails from \$143,169 to \$622,808. and the profits

were divided among the large contractors and some government officials. Those implicated included Thomas J. Brady, second Assistant Postmaster; Stephen W. Dorsey, Senator from Arkansas; and a number of subordinates in the Post Office Department. Dorsey and Brady were tried, but not convicted, and only one of a large number indicted was ever punished. However, the irregularities complained of were ended and the combination was broken up.

STARS, the group of heavenly bodies which are situated outside of our solar system, differing from the planets in being self-luminous. All the planets present a sensible disc when examined with a telescope, or even with the naked eye, but the strongest 'nstruments fail to show that the stars are more than mere points of light, and their light, instead of being regular, continually twinkles. It is not known definitely why the light from the stars presents a twinkling appearance to the eye, but it is thought to be due to the presence of particles of dust, vapor, and other substances within the belt of air that surrounds our planet. Careful examination has revealed a slight twinkling effect of the light coming to us from the planets, moon, and sun, but their being nearer to us causes the light to come from several points, tending to produce a steady impression, while the light emanating from the stars proceeds from an apparent point and is thus interfered with. The movement of the planets can be easily observed by the naked eye, but by superficial examination it is impossible to detect any movement of the stars. Ancient astronomers called them fixed stars for this reason, a term still frequently applied, but it has been successfully established that they are not fixed in space in regard to each other. They appear to move from east to west, though this apparent motion is due to the revolution of the earth upon its axis. However, some apparently pursue a path of revolution, and it is reasonable to infer that a heavenly body cannot remain permanently at rest.

Stars are classified in groups, called constellations, for convenience in study and description, and some of them were named from their supposed resemblance to some figures, such as perching birds, contorted snakes, and fierce ani-With a few exceptions, the likeness is purely fanciful. The stars constituting the constellations are distinguished by the letters of the Greek alphabet and of the Roman alphabet, and, when the letters of the two alphabets have been exhausted, then numerals are employed. Though no magnitude in a proper sense has yet been discovered in any star, the term is applied to distinguish them according to brightness. The brightest stars visible to the naked eye are of the first magnitude, and the faintest of the sixth magnitude, while all stars that cannot be seen without the telescope are called telescopic stars, these ranging at present to the sixteenth magnitude. Astronomers assert that the number of

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stars of successive magnitudes increases nearly in geometric proportions, as follows:

1st Magnitude			20 1	6th Magnitude		. 5.000
2d	**		65			. 20,000
3d	**		200	8th	**	. 68,000
4th	**		500	9th		.240,000
5th	44		400	10th		.720,000

At present it is considered that the star Centauri, in the southern heavens, is the nearest to the earth. The distance is about 200,000 times that of the earth from the sun, or 19,000,000,000,000 miles. This distance is so great that our imagination fails to grasp the thought or form a picture of the vast void across which we are gazing. Since this is the nearest of the stars, it is not difficult to realize how immeasurably farther other heavenly bodies are situated from us. It is evidenced from this that the stars cannot shine like the planets or the moon, by reflecting back the light of the sun, but instead are self-luminous bodies, and doubtless are the centers of solar systems lying far beyond our own. Few persons can discern more than 4,000 stars with the naked eye, although persons with keen eyesight may discern fully 6,000, and the most powerful telescope is able to reveal a total of about 600,000 in the northern and southern heavens. The stars seem to be irregularly distributed, with here and there groups apparently belonging to a particular system. In some portions only a few stars are to be seen and in others they are apparently crowded into close proximity, as in the Milky Way. The light coming to us from the stars is variously colored, but spectrum analysis has revealed that their composition is similar to that of our earth, the light indicating the presence of mercury, iron, hydrogen, magnesium, sodium, bismuth, and other familiar substances. Some shine with light of a yellow tinge, while others show traces of purple, orange, green, blue, yellow, red, and indigo, and the light of some is perfectly white.

The German astronomer, Friedrich W. A. Argelander (1799-1875), estimated that the total light coming from the stars is equal to oneeightieth of the average full moon. The light of some appears to undergo periodic changes by increasing and diminishing in brightness; such stars are called periodic, or variable. Others catalogued by astronomers in ancient times have entirely disappeared and are known as temporary Powerful telescopes have revealed that some of the brightest stars really consist of two or more situated in the same part of the heavens, these being called double and multiple stars. The star Arcturus and several others are apparently coming nearer to the earth, while Sirius is receding. Nothing definite is known regarding the size of stars, since their light may be modified by a difference in their distance, size, or intrinsic brightness, and for this reason the faintest stars may not be the most distant from the earth. It is estimated that the light proceeding from Sirius surpasses that of the sun 64 times.

STARVATION (stär-vā'shun), or Inanition, the condition of exhausted vitality and waste of tissue, followed by death from a want of food. Scant and impure food is the cause of slow starvation, and this form sometimes results in man from a deficiency of constituents necessary to a mixed diet. The absence of both food and water causes man to die in from five to ten days, depending upon age, vitality, and climatic conditions, but a supply of water may extend the period of life somewhat. Usually the weight of the body is reduced to three-fifths of the usual weight before life ceases. We learn from animals that hibernate, such as some species of the bear, that the body is supplied with a large per cent. of adipose tissue, which serves to sustain life, while waste is reduced to a minimum by breathing slowly and a decrease in the beating of the heart. Among the effects of starvation before death ensues are a softening of the mucous membrane, the loss of power to resist cold, severe pain in the head and stomach, and finally violent convulsions. Adults survive longer than the young.

STATE, the name applied generally to a community that is organized under permanent law and has an independent government. The conditions of organization are numerous, differing vastly in form, but the purport of the state is universally to maintain justice and the security of all its members. In a certain sense it is coöperative, especially where the right of suffrage is general or at least vested in a large part of its citizens. With regard to its character, it is said to be paternalistic or individualistic, depending upon whether the state discharges functions that relate to the close supervision of industries and public utilities, or confines itself to the maintenance of peace, the punishment of crime, and the perpetuity of itself as a commonwealth. All states have been justified by referring their origin to God, even the maintenance of democracy, and their early development was through the influence of patriarchs that perpetuated itself.

In ancient times, Plato and Aristotle, as well as others of high repute, held to the view that the city should be the nucleus of the state, giving form and character to the public mind by reason of its higher advancement in arts and education. During the Middle Ages a powerful sentiment grew up in favor of an alliance between the church and state, and this form was discussed by such writers as Aquinas and Dante. Machiavelli, on the other hand, sought to divorce politics from theology and ethics, but advocated a strong central monarchical government. Natural rights were made the basis of government in the theories of Locke and Rousseau, while Thomas Hobbes used the theory of natural law to defend absolutism. These writers sought to solve the problem of government without making history a primary basis, while Montesquieu referred political science to the history of past

events, upon which he based his theory of government.

The United States of America and the Commonwealth of Australia are divided into political divisions known as *states*. However, the name states in this sense is a designation of a division rather than that of a sovereign political organization. The states referred to do not possess many of the powers of an independent government, such as declaring war and making final decisions in judicial causes of a national character, these powers being reserved by the central or federal government. The name *province*, as used in Canada, is equivalent to the word *state*, as used in Australia and the United States.

STATE, Department of. See United States, Departments of.

STATEN ISLAND (stăt'en), the largest of several islands in New York harbor, which forms the whole of Richmond County. It is separated from Long Island by the Narrows and from New Jersey by Staten Island Sound. The length is thirteen miles, the greatest width is eight miles, and the area is 58 square miles. Stermboat connections are maintained between it and New York City, to which it was annexed within recent years. The surface is of a rolling character, with soil well adapted to farming and gardening, and it has a number of thriving villages and towns. All the shore villages and Richmond, the county seat, are reached by rapid transit. Many of the villages are noted as summer resorts, being improved by fine gardens and commodious hotels and lecture rooms. towns have good public school and church facilities Staten Island has numerous manufacturing establishments, including machine shops, cigar factories, and mills. It is the seat of Sailors' Snug Harbor, a retreat for disabled seamen, and has several hospitals. Population, 1910, 85,969.

STATES-GENERAL (stats'jen'er-al), the name of the legislative body of the Netherlands. It is composed of two chambers, an upper and a lower, members in the former being elected by the provincial states and in the latter by the citizens. In the history of France the name of States-General has reference to the assembly made up of the nobility, the clergy, and the third estate, or the bourgeoisie. It is thought to have originated with Charlemagne, but the first convocation of which there is an authentic record is that of 1302, which assembled as directed by Philip the Fair, who convoked it to give greater weight to his policy in the quarrel with Pope Boniface VIII. Subsequently absolutism spread in France and there was no convocation until 1614. From that time until 1789 there was no assembly of this body, but in the latter year the Third Estate refused to abide by the regulation agreed upon between the other two orders.

STATES' RIGHTS, the doctrine that every State is sovereign within the limit of its own sphere of action, made so by the declared will of the nation as expressed in the Constitution, and that the nation may not abridge or abrogate that sphere. The rights of the national government are distinctly stated in the Constitution and the rights of the states are limited only by the expressly declared national right. All concede that both the nation and the states have certain rights, and in this respect both have more or less clearly defined powers. The term has often been misapplied to the doctrine of State sovereignty, which implies that the states, at the formation of the Union, delegated a portion of their sovereignty to the national government, reserving the right to revoke the agency and resume the exercise of all the elements of sovereignty at any time by seceding.

State sovereignty was first asserted by the legislatures of Virginia and Kentucky, in 1798, when they formerly protested against the Alien and Sedition Laws, by which the President was empowered to punish sedition in the states and to remove any alien or foreigner whose presence was a source of danger. The doctrine was asserted by Henry Clay and the State of Maryland in 1811 and in 1819, who declared that Congress did not possess authority to charter the United States Bank. Another instance is found in the convention held in South Carolina in 1832, which declared the high protective tariff null and void, but trouble was averted by passing Clay's Compromise Bill. The doctrine of State sovereignty became the ally of slavery soon after the nullification troubles, and the Southern States carried into effect its principles by seceding from the Union, but the Civil War greatly modified the doctrine. However, in a modified form it still has a place among the live public questions. This is exemplified in the issues involved in the regulation of interstate commerce and certain legislation by the states, as in the controversy about the attendance of Japanese upon the schools of California, in 1909.

STATICS (stat'iks), the branch of dynamics which treats of for es that counterbalance one another, hence produce no motion or change of motion. Some writers use the word statics in opposition to dynamics, in which sense the former is the science of rest, of equilibrium, and the latter that of motion, both together constituting mechanics.

STATISTICS (stà-tis'tiks), the science which relates to the collection and arrangement of important facts, such as have reference to the financial, social, intellectual, and political conditions and resources of a state or nation. Though some departments of statistical knowledge are of very ancient origin, the credit of founding the science of statistics is credited to Professor Achenwall (1712-1772), of the University of Göttingen, who treated the subject freely in his "Outlines of Political Science." In this work he called attention to the fact that the statistics of the political science of the several nations is very differently understood, and that there is no general agreement in the number and arrange-

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ment of the parts treated in books on the subject. From this work the title statistics came into general use, and now the collection of facts and data relating to this subject is an important function of all civilized governments. Practically all nations take a general census at stated intervals, usually every ten years, and in many cases enumerations of population and industrial data are made every five years, as in Germany and some states of the United States.

STATUTE (stăt'ût), a law established by the act of a representative assembly, such as a legislature, congress, or parliament. Statutes enacted by the lawmaking branch of the general government are termed national, while those of a state or province are called state, or provincial, statutes. Where a statute is enacted by the legislature of a state or province, it must necessarily be in conformity with the written or understood constitution of the nation, otherwise it is void on account of being unconstitutional. A statute is said to be mandatory when it directs the performance of an act, as in the case of public officials or in authorizing the organization of corporations; prohibitory, when it forbids the commitment of an act; directory, when it does not definitely specify certain acts, as the time and manner of filing certain official reports; and permissive, when it leaves certain acts of a citizen optional, as the disposition of property by will.

STAUBBACH (stou'bag), a waterfall of Switzerland, in the canton of Bern, 7 miles southeast of Interlaken. The descent is nearly 900 feet, hence it is the highest fall in Europe. In Germany the name means dust stream, having reference to the appearance of the water, which is quite similar to a spray of dust some distance before the valley below is reached.

STAUNTON (stan'tun), a city of Virginia, county seat of Augusta County, 38 miles north of Lynchburg, on the Chesapeake and Ohio and the Baltimore and Ohio railroads. It is surrounded by a fertile farming region. The manufactures include flour, musical instruments, carriages and wagons, ironware, and machinery. Among the noteworthy buildings are the county courthouse, the Masonic Temple, the Columbian Hall, the high school, and the public library. It is the seat of the Western State Insane Asylum, the Virginia Institute for the Deaf, Dumb, and Blind, and the Kable's Military Academy. Highland Park and Gypsy Hill Park are fine resorts. It has a growing trade in farm produce. The place was settled in 1745 and became a city in 1871. Population, 1900, 7,289; in 1910, 10,604.

STAVANGER (sta'vang-er), a city of Norway, at the head of Bukken Fiord, an inlet of the North Sea, 190 miles southwest of Christiania. The chief ecclesiastical building is a Gothic cathedral, one of the finest in the country, and it has a number of fine schools and public buildings. The harbor is safe and commodious and the city has a large foreign trade

in fish, timber, and marble. It has shipy: .ds, machine shops, cotton and woolen mills, brick-yards, and manufactures of clothing. Co amunication inland is by railway and electric lines. The public utilities include electric and gas lighting, waterworks, and sewerage. Population, 1910, 37,118.

STAVROPOL (stäv'rō-pōl-y'), a city in southern Russia, capital of the government of Stavropol, on the northern slope of the Caucasus Mountains, 200 miles southeast of Rostof. It has an extensive trade in sheep, horses, cattle, and merchandise. Among the features are electric street railways, stone and asphalt pavements, and several government buildings. The province of Stavropol borders on the Caspian Sea and is watered mainly by the Kuma and Kuban rivers. It produces large quantities of cereals and live stock and is important as a silk-producing region. The city in 1917 had a population of 46.445.

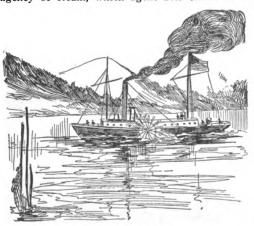
STEAD, William Thomas, journalist and author, born at Embleton, England, July 5, 1849; died April 15, 1912. His father, a minister, directed his early training with a view of having him engage in a business career. In 1871 he became editor of the Northern Echo, a periodical published at Darlington, and served efficiently until 1880, when he was made assistant editor to John Morley on the Pall Mall Gazette. From 1883 until 1890 he edited this publication, and in the latter year founded the Review of Reviews. Subsequently he established similar periodicals in the United States and Australia, and was a leading spirit in the introduction of published illustrations and interviews in the daily newspapers of Great Britain. His vigorous exposure of crime in large cities resulted in the passage of the criminal law amendment bill in 1885. His publication entitled War Against War was started in 1898 as an opponent to the British war in South Africa. Among his many published works are "If Christ Came to Chicago," "Truth About Russia," "Maiden Tribute of Modern Babylon," "Story that Transformed the World," "Satan's Invisible World," "A Study of Despairing Democracy," "Americanization of the World," "Mr. Carnegie's Conundrum," and "Last Will and Testament of Cecil John Rhodes."

STEAM, the gaseous form of water, especially the gas into which water is changed by boiling. It is a colorless and transparent gas when the water has been vaporized to an extent that none is held in mechanical suspension, but is termed wet steam, or saturated steam, when a part of the water is held suspended mechanically. In the latter case it is produced under low pressure, or is affected by a low temperature, as the visible cloud of steam passing from a vessel, which is composed of minute drops of water produced by the condensation of the steam as it issues into the colder air. Water changes into aqueous vapor by surface evaporation at all temperatures, but the term steam is not properly

applied to other than the vapor resulting from boiling. The boiling point of water depends on the pressure upon the surface, the purity of the water, and the nature of the vessel, but at ordinary atmospheric pressure it boils in an open vessel at a temperature of 212°. If the pressure on the surface be increased, the boiling point is raised correspondingly. Pure water boils at a lower heat than when containing a considerable per cent. of salt.

The temperature of steam is the same as that of boiling water; the heat supplied simply suffices to convert the water into gaseous steam without raising the temperature of the steam, and as soon as the temperature is slightly lowered a part of the so-called dry steam, or pure steam, is condensed and forms wet steam. When boiling begins, the water remains at the same temperature, all the heat applied acting to change water into steam. This is ordinarily expressed by saying that the heat becomes latent in steam, and, the greater the latent heat, the more is manifested its elasticity or power of pressure. Thus heat is the power in steam which enables it to do work. If the water is boiled in a closed vessel the steam accumulates and both pressure and temperature increase, but the pressure increases more rapidly than the temperature. In the process of highly heating steam, its temperature rises until it acts like a perfect gas, when it is said to be superheated steam. The most important uses of steam include its service as an agent for the production of mechanical force in manufactories, steamboats, and railway engines. It is employed extensively in brewing, distilling, warming buildings, heating baths, and for cooking purposes.

STEAMBOAT, a vessel propelled by the agency of steam, which agent acts either on a



THE CLERMONT.

screw or on paddles. Inventors began to give attention to improvements in navigation as soon as machines were constructed to successfully employ steam as a propelling agency. Little

success crowned the efforts until 1736, when some progress was made by Jonathan Hulls in constructing a towboat to be moved by a steam engine setting a paddle wheel in motion. The idea had been suggested by wheel boats propelled by oxen or horses, which were used to some extent as early as the time of the Romans, but the application of steam at that time did not prove entirely successful. John Fitch and James Rumsey, two Americans, constructed vessels to be driven by steam in 1786. The paddle boat launched by Fitch moved at the rate of four miles an hour, but the one constructed by Rumsey was propelled by a stream of water issuing from the stern and did not prove successful. Extensive experiments were made about the same time in England and France, but the first really practical steamboat and the one that marks the epoch of steam navigation was built by Robert Fulton and Robert R. Livingston in 1807.

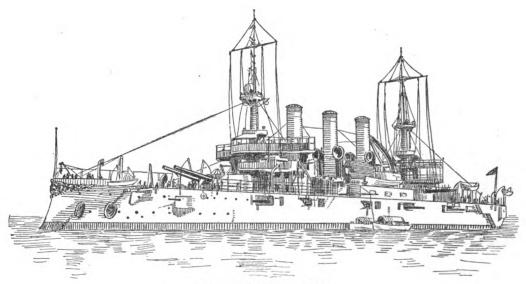
Fulton had seen a vessel named the Charlotte Dundas, a steamboat with one paddle wheel near the stern, constructed in England in 1801, and from it he patterned in building the Clermont, which was launched in 1807 and served for regular trips on the Hudson between New York and Albany. The Clermont was 130 feet long and had a speed of five miles an hour. Fulton and Livingston established a yard for building steamboats at Pittsburg in 1811, at which a number of vessels were completed for river service and later several were built for use on the Great Lakes. The first steamboat passed from Glasgow to London in 1815 and from New York to New Orleans in 1818. The first steam vessel to be used in the British navy was called the Comet, which was launched at Woolwich in 1822. In 1838 the first two steamboats crossed the Atlantic, the Sirius sailing from Cork and the Great Western from Bristol, both vessels reaching New York on April 23. The Sirius made the trip in nineteen days and the Great Western in fifteen, their arrival at the port of New York being watched by a large crowd of eager spectators. These vessels were of the paddle-steamer type, a form of construction used almost exclusively at first. The largest vessel of this type was the Scotia, launched by the Cunard line in 1861, which crossed the Atlantic in nine days. Its length was 366 feet; breadth, 48 feet; and the stroke of the engines, 12 feet. The Cunard line established regular communication between Liverpool and New York in 1840, being the earliest to make such connections, and soon after began to make regular trips between other important ports.

Captain Ericsson, in 1837, successfully applied the screw propeller, an apparatus made in modification of the common screw, which is driven by steam to propel ships through the water. It is constructed of spiral plates or distinct blades attached to a central shaft or cylinder

and is placed immediately before the stern post, at the bottom of the ship. The ships are given an onward motion because of the propeller being driven rapidly in the water by the steam engines. It soon became apparent that the screw propellers possess many decided advantages over either rear end or side paddle wheels, and consequently came rapidly into general use.

A decided advantage has been obtained in the use of iron and steel instead of wood for the construction of sailing vessels and consequently ocean navigation has become much more efficient and rapid. Formerly from twelve to fifteen days were required to cross the Atlantic, but now first-class vessels make the passage in five or six days. The Europa, a vessel of the Hamburg line, may be taken as a type of modern vessels constructed of steel, and is one of many excellent steamers sailing between American

as rivers, canals, and lakes, are of smaller construction than those employed for service on the ocean. The depth and character of the water to be navigated determine in a large measure the construction. The smaller boats are fitted to use six feet draught of water successfully and usually are stern wheelers, but the larger steamboats of interior waterways have kept pace reasonably well in speed and equipment wi'n the ocean liners. The latter have a speed ranging from 525 to 565 knots in 24 hours, while the best steamships for interior waterways have a speed of from 425 to 500 knots, though the smaller vessels range much lower. Screw propellers are employed extensively on the Great Lakes and the deep rivers, but many vessels propelled by paddles are in use for freighting and for towing barges and other vessels. Steamboats used for passenger service are structures



DATTLESHIP CONNECTICUT.

and European ports. It is 911 feet long, 53 feet deep, and 96 feet wide. This great vessel has a tonnage of 50,000. However, it is exceeded in speed by some vessels. Up to 1914 the best record in sailing from Europe to America was made by the Deutschland (Germany), which sailed from Cherbourg, France, to Sandy Hook, N. Y., a distance of 3,045 miles, in five days seven hours and twenty-eight minutes. The trip from Queenstown, Ireland, which is shorter than that from Cherbourg, has been made in five days seven hours and twenty-three minutes. This is the record made in 1908 by the Lucania. However, such vessels as the English Mauretania are much larger and have a higher speed. The Connecticut, which has a displacement of 16,000 tons and a speed of 18 knots, is a type of the American battleships which are now in service.

Vessels for navigating interior waters, such

of very large dimensions and much beauty, being supplied with fine parlors, steam heat, and electric lights. See Ship.

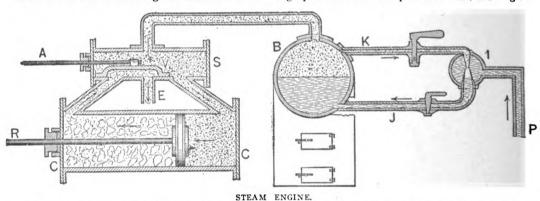
STEAM ENGINE, a machine for utilizing the elastic force of steam as a motive power now constructed in a variety of forms. The power of heat to do work when combined with other elements in the form of steam was known to some extent to the ancients, though its extensive use is entirely modern. Hero of Alexandria, about 150 B. c., described the earliest steam engine, which was exhibited in the Serapeum at Athens. It was called the acopipile and consisted of a boiler for generating steam, from which extended two pipes to a sphere made to rotate by the inflowing current of steam. Nothing of material interest resulted during the succeeding centuries until Baptista Porta, the inventor of a camera-obscura, in 1606, published a pamphlet in regard to the

writings of Hero and mentioned a lifting pump that served to raise water by steam pressure. The Marquis of Worcester, in 1665, described a steam engine in his "Century of Inventions," but this was followed by no practical results, and in 1698 Captain Savery constructed an engine to raise water.

Considerable progress was made by German a.d French inventors in constructing various devices, but James Watt is the accredited inventor of the modern steam engine, applying its principles in 1763. While observing the action of steam originating from boiling water in a teakettle, which caused the lid to rise and fall alternately, he received suggestions that led to the invention of a mechanical structure for condensing the steam in a separate vessel some distance from the cylinder. He patented a single-acting steam engine in 1769 and in 1782 obtained a patent for a double-acting steam engine, but previous to that had already introduced a method of allowing the steam to work

made for that purpose. In the simple form of the engine there are two of these openings, called ports, one at the front and the other at the back of the cylinder (C, C). A large opening called the exhaust (E) is situated between the two ports, through which the steam may escape from that side of the piston from which the steam has been cut off. The rod (A) works a contrivance (V), called the slide valve. which moves over the portholes and exhaust in such a manner that the steam is admitted to different slides of the piston, as it moves backward and forward in the cylinder, and opens the exhaust to allow the dead steam to escape. The alternating motion of the piston rod (R) is converted into a steady rotary motion by means of a crank and thus produces a continuous rotary motion of a wheel attached to the moving shaft; in this way continuous motion of the machinery is secured.

The two classes of steam engines are called high-pressure and low-pressure. In the high-



A slide valve rod B boiler; C. C, cylinder: B, exhaust; I, hot well; I, pipe to admit water to the boiler; K, pipe to supply steam to the hot well; P, pipe from the pump; R, piston rod; S, steam chest; V, slide valve.

expansively. Since then many improvements have been wrought in the construction of steam engines and their uses are very numerous in all phases of industrial and commercial enterprises. They vary in size from the small toy engine, used by the child in play, to the large and skillfully constructed machines employed in large factories, in locomotives, and in ocean steamers.

The boiler (see [B] in the figure) to generate the steam, though usually considered a separate device, is an essential mechanism in the use of a steam engine. A pump forces the water through the pipe (P) into the tank (I), called the hot well, where it is warmed by means of steam admitted through the pipe (K). The water required in the boiler is taken from the hot well through the pipe (J) by an injector or a force pump. From the boiler the steam passes through a pipe, as shown in the figure, leading to the enclosure (S), called the steam chest, which is so constructed that the steam cannot pass from it except by openings

pressure engine the steam, after it has done its work, is forced out into the air through the exhaust. The puffs of steam which escape from such engines denote the speed of the piston being driven backward and forward. In the low-pressure engine the dead steam is condensed in a separate chamber by a spray of water, thus lowering the pressure on that side of the piston from which the steam has been cut off. A pump, called the air pump, removes the water from the condenser. The slide valve in both forms of engines is operated by means of a bent lever moved by an eccentric rod. An apparatus called the governor (q. v.) regulates to some extent the supply of steam required by the engine. The dead points of the engine are at the farthest part of the stroke of the piston, when the slide valve is arched over the exhaust and closes both ports. If the engineer opens the throttle valve, live steam fills the steam chest, but it cannot enter the cylinder unless the fly wheel of the engine be moved until the back port becomes opened. When the engine is in motion the fly wheel by its inertia continues to move and carries the crank past these points.

A locomotive is a self-propelling steam engine which travels on wheels and is used for various purposes, but mostly on railroads. The first steam carriage was patented by James Watt, in 1784, and numerous patents have been taken out in different countries, but carriages propelled on the common roads have thus far been impracticable. This is due largely to the fact that they are too expensive for individual use and because few highways are fitted for conveyances of that kind. The oldest locomotive now in existence is called Puffing Billy and is in the Patent Museum at South Kensington, England. It was constructed in 1813 for service on a railway track and was used for some time in freighting and carrying passengers. Stephenson, in 1814, built the first locomotive resembling those in practical service. His engine, called the *Rocket*, had two cylinders, one on each side of the engine, and the whole locomotive weighed a little less than five The boilers of modern locomotives are tubular in form, and the engine is driven by two and sometimes by four cylinders. Waste steam from the cylinders is discharged through a pipe to the chimney of the engine and is utilized to create the draught for the boiler. The steam from the cylinders acts on cranks on the axle of the driving wheels, which are four to nine feet in diameter.

Locomotives have six, eight, and in some cases twelve wheels, two, four, or six driving wheels being coupled together. They usually weigh 50 to 60 tons, but sometimes even more than 100 tons, and the speed ranges from 30 to 75 miles an hour. The capacity ranges from 4,500 to 6,000 horse power. A tender or car is attached to provide a supply of water and fuel. It is estimated that a ton of bituminous coal is consumed on level roads every thirty miles, and about two pints of oil are used to lubricate the machinery. The life of an engine is about thirty years, and the cost of construction ranges from \$15,000 to \$25,000. One of the largest engines ever built was completed in 1900 at Pittsburg, Pa., for service in hauling ore cars from Conneaut, Ohio, to Albion, Pa. The total weight is 391,400 pounds; the boiler capacity, 7,500 gallons; the steam pressure, 220 pounds; and the heating surface, 3,564 square feet. Traction engines are used extensively in propelling thrashing machines. They serve to drive the machines and to move them from place to place.

STEAM HAMMER, a powerful machine hammer, employed in making large iron and steel forgings. It was invented by James Nasmyth (1808-1890) of Edinburgh, in 1838, and was patented four years later. A form of the steam hammer had been used in France for some time, from which the inventor secured

a number of suggestions, but added several new and valuable improvements. The hammer is raised by steam to the required height, the propelling force acting against a piston, and when the steam is cut off the exhaust valve opens, thus permitting the hammer to descend. The height of the fall and the force of the blow can be regulated at will. In an improved form the hammer moves to the required height between the guides and effects a downward blow in such manner that the steam and the weight of the moving parts act together in one direction, though in most of the machine hammers the steam is used only to raise the hammer, which is allowed to fall by its own weight. Steam hammers of an enormous size are not uncommon, frequently weighing 100 to 125 tons. The largest ever made was completed in 1888 by the Krupp works at Essen, Germany, and weighs 150 tons. In some of the factories using vast machinery for steel and iron forging, steam hammers propelled by hydraulic or pneumatic power have been introduced. Machine hammers are constructed with a view of regulating the force applied, being capable of doing the heaviest forging or the most delicate work.

STEAM SHOVEL, a machine for excavating material on dry land, being a modified form of the steam dredge. The steam shovel came into extensive use about 1865 and is employed largely for excavating in railway construction. It consists essentially of a steam hoisting engine and a movable crane, both being mounted on wheels fitted to run on a track. The crane is attached by a hinge at the lower end to the frame and carries a scoop or shovel. When the scoop is lowered to the place where an excavation is being made, it is thrust into the earth by a mechanism, which causes it to be filled with earth. It is then raised by the crane and swung so as to carry the load over a car, when the latch is pulled by means of a cord, thus opening the swing bottom of the scoop and permitting the contents to fall into the car or upon the place where they are wanted. In most cases the earth is loaded in cars and transported to a locality where a heavy grade is built, but sometimes the excavated earth is merely thrown out to the side and the railway track is afterward laid in the cut. Steam shovels are used to some extent for cutting drainage and irrigation canals. In the Lake Superior region a large number are employed for digging ore and loading it upon cars for transportation to the smelter. Where the earth to be excavated is firm or rocky, the scoop has strong steel teeth at the edge or lip.

STEAM TURBINE, a machine in which the kinetic energy of expanding steam is used to cause rotation, the force acting upon a wheel provided with vanes. In the steam engine the steam is admitted into a closed cylinder, where it produces motion by acting upon a movable

piston, while in the steam turbine the expansive force of particles of steam, through the property of expansion, have an effect similar to that of water on the turbine wheel. Several styles of steam turbines are in use, some having a series of turbine wheels on one shaft. The steam transmits to each turbine wheel a rotary impulse, partly by reaction and partly by direct impulse, but the wheels vary somewhat in the size of the diameter, succeeding ones being slightly larger to adapt them to the pressure as the steam expands. Steam turbines are high in speed and a train of gearing is used to reduce the speed to a suitable velocity for working purposes. They are used chiefly on steamships, since they cause less strain and greater uniformity in the rate of speed. While machines of this kind were used at a comparatively early date, the first steamer propelled by steam turbines did not cross the Atlantic until in 1905.

STEAM WHISTLE, an apparatus for producing a loud whistling sound through the agency of steam. It is attached to a steam boiler, as in a locomotive, and the sound is produced by a rapid discharge of the steam, which issues from a narrow annular orifice around the upper edge of a cup or hemisphere, then striking the thin edge of a bell above it. The sound is produced in the manner of a common whistle or an organ pipe. The steam is shut off by a stopcock, to which a cord or wire is attached for the purpose of opening the stopcock and thus permitting the steam to rush through the opening when a signal is to be given. An instrument known as the calliope has a number of steam whistles suitable to produce musical tones, the length of the pipe or cup giving variations to the sound produced.

STEARIC ACID (stě-ăr'îk), a product obtained from mutton suet and other fats that contain stearin. It is inodorous and tasteless. combines with numerous bases, and with the latter forms acid and neutral salts called stearates. It is insoluble in water, but is soluble in alcohol. In fats it exists in combination with glycerin. It is used in making candles.

STEARIN (ste'à-rin), the principal constituent of fats, obtained from fats by saponification; that is, by decomposition through the agencies of alkalies. It is less soluble than olein and palnitin, the other constituents of natural fats. In ether and alcohol it is soluble, but is insoluble in water. The chief use is in-

making soap and glycerin.

STEDMAN, Edmund Clarence, poet and critic, born in Hartford, Conn., Oct. 8, 1833; died Jan. 18, 1908. After studying at Yale University, he engaged in journalism, serving as editor of the Norwich Tribune and later of the Winsted Herald. In 1854 he settled in New York City to engage as a contributor to periodicals, but soon became an editorial writer for the New York Tribune. He was field correspondent for the New York Herald in the

Civil War and in 1864 engaged in banking in New York City. The first volume of poetry from his pen was published in 1875 under the title of "Victorian Poets," which went through a large number of editions, and by them and others the author earned a high place as a critic and writer of verse. He is counted one of the foremost American poets of the early part of the 20th century and is eminent as a critic of poetry. His chief writings include "Library of American Literature," "Nature and Elements of Poetry," "Hawthorne and Other Poems," "Poets of America," "Victorian Poets," and "Lyrics and Idyls." Yale conferred the degree of master of arts on him, in 1871, and subsequently he was honored in the same way

by Dartmouth.

STEEL, a compound or alloy of iron. It contains a greater or less per cent. of carbon, and in this respect ranges between wrought iron and cast iron. Wrought iron has only a small quantity of carbon and cast iron sometimes as much as 10 per cent., while ordinary steel possesses from 1 to 2 per cent. The value of steel depends principally upon its durability and the ease with which it can be hardened or softened. The operation in which the change in hardness is brought about constitutes the process of tempering. It becomes soft and malleable like soft iron when heated and allowed to cool slowly, but, if heated to redness and plunged suddenly into cold water, it is rendered exceedingly hard. The degree of hardness can be easily regulated by the intensity of the heat applied and by the suddenness of plunging it into cold water. Steel can be welded almost as easily as iron when in a red-hot condition and melts at a lower temperature than soft iron. The color is a bright grayish-white and it is denser, finer, smoother, and more elastic than iron. It takes a brighter polish than iron, rusts less easily, and has a granular texture.

GRADES OF STEEL. Various names are applied to the different grades of steel, depending on the process it has undergone in manufacture. German steel, or natural steel, is a grade obtained from the ore or from the cast iron. Blister steel, or cement steel, is made by piling soft iron bars between layers of charcoal in fire-clay boxes, which are then heated to redness in a furnace, and the temperature is maintained for several days. In this process the iron absorbs a certain portion of carbon and is converted into steel. Cast steel is produced by melting cement steel. This grade is imperfect, owing to the carbon uniting in unequal quantities with the iron. In the process of making cast steel a crucible is employed and in the ordinary method a powerful wind-furnace blast is applied. Shear steel is obtained from cement steel, the latter being rolled or beaten into bars. Steel obtained from cast iron in the refining house is called furnace steel, and the grade that

has undergone only one application of the refining process is designated rough steel.

The most important method of manufacturing steel is named the Bessemer process from its inventor, Henry Bessemer. It is a cheaper and better method than was known previously and has greatly reduced the price of steel. Besides, it has been the cause of a much freer use of steel in all the more important products of the manufactories. It consists in completely decarbonizing cast iron and then adding a sufficient quantity of cast iron of the proper quality to give the whole mixture the desired amount of carbon. This is done by melting the cast iron in a furnace and then drawing the molten mass off into a large covered crucible. A blast of air is forced into the melted metal, which operates to raise the heat sufficiently to burn out the carbon. A quantity of cast iron very rich in carbon, called by the Germans spiegeleisen (mirror-iron), is added when the molten mass has become decarbonized and the blast is continued for a short time. This operates to remove the remaining impurities and gives the steel its proper consistency, after which it is drawn from the crucible or converter into the casting mold. Various other processes of manufacturing different grades of steel are employed with success, all of which are more or less important in obtaining the desired classes of Bessemer.

PRODUCTION OF STEEL. The United States, England, and Germany are the three most extensive producers of steel. The steel production in the United States averages about 34,108,500 tons annually, which is about equal to the combined product of England and Germany, but the steel output of the latter country exceeds that of England. In 1917 Germany produced 12,987,500 tons of steel; Great Britain, 10,468,-250 tons; France, 3,325,260 tons; and Canada, 1,250,000 tons. Steel is used extensively for shafting, tubes, boiler plates, ship plates, nails, rivets, tin plate, firearms, machinery, edged tools, and scientific instruments. Within recent years it has gone into use largely for construction purposes, especially in erecting bridges, elevators, and tall buildings in cities.

STEEL, Sir John, sculptor, born at Aberdeen, Scotland, 1804: died Sept. 15, 1891. He studied at Edinburgh and later at Rome, and gained a prize for the seated statue of Sir Walter Scott, which forms part of the monuments erected in Edinburgh. In the same city is his colossal statue of Queen Victoria. In 1850 he completed the bronze equestrian statue of the Duke of Wellington, also in Edinburgh. Two of his statues are in New York City, one of Robert Burns and one of Sir Walter Scott. His works include the memorial statue of Prince Albert, unveiled in 1876.

STEELE, Sir Richard, eminent author, born in Dublin, Ireland, in 1672; died at Carmarthen, Wales, Sept. 1, 1729. His father was an attor-

ney in the city of Dublin, where the son attended school and afterward studied at the Charter House and at Oxford. In the two latter institutions he was largely influenced by Addison, who was his personal friend and aided him materially. He enlisted in the military service in 1694, rising to the rank of captain by 1702. Shortly before he had published a work entitled "Christian Hero," in which he endeavored to show that religious principles are essential in reforming customs and manners, but its strictness brought ridicule on the author, since he was by no means strict in his own personal conduct. Queen Anne gave him a court appointment in 1706, and this, together with his marriage to a wealthy lady named Mary Scurlock, gave him an adequate income. However, he was extravagant and a man of many wants and consequently quite often felt financial straits. Addison assisted him to secure the appointment as editor of the Gazette, in 1707, and two years later he began the publication of a triweekly known as the Tatler, in which he published short essays and town gossip. In 1710 he began the publication of the Spectator, a literary journal issued daily, and in 1713 began issuing the Guardian.

The literary fame of Steele rests largely on the essays contributed to the Tatler, Spectator, and Guardian, in which he published respectively 188, 240, and 82 contributions of merit. Though himself a ready and pleasant writer, he was assisted by contributions from Addison, Swift, Berkeley, and others, all of whom wrote for his publications. When the Tories came into power, in 1710, he lost the office of gazetteer in the House of Commons, which he held for four years, largely because of publishing articles in The Crisis that were considered treasonable. He secured his position again on the return of the Whigs to power shortly after the death of Queen Anne, was elected to Parliament for Boroughbridge, and George I. knighted him. Among his writings not named above are "The Conscious Lovers," his best comedy, and journals entitled "Town Talk," "The Plebeian,"
"The Reader," "The Englishman," "The TeaTable," and "Chit-Chat."

STEEL ENGRAVING, the art of engraving on steel plates for the purpose of reproducing prints or impressions in ink upon paper and other substances. Work of great delicacy can be executed on steel, both by etching and by cutting with the graver, and the printing obtained from a plate of this kind possesses superiority in brilliancy and exactness. The art of steel engraving is comparatively modern and originated with those designing to overcome forgery and imitation of bank notes and government securities. It is employed largely by the government in engraving securities and bank notes. In the fine arts it is used for reproducing the works of master painters. Engraving.

STEELTON (stel'tun), a borough of Pennsylvania, in Dauphin County, three miles southeast of Harrisburg, on the Susquehanna River. It is on the Pennsylvania and the Philadelphia and Reading railroads. The surrounding country produces fruits, cereals, and coal. It is the seat of extensive manufacturing establishments, among them rail mills, blast furnaces, planing mills, bridge construction works, shirt factories, and machine shops. Electric and gas lighting, waterworks, sanitary sewerage, and electric street railways are among the improvements. It was settled in 1865 and incorporated in 1880. Population, 1900, 12,086; in 1910, 14,246.

STEELYARD (stel'yard), an apparatus for weighing, so called from the Steelyard, a place in London where steel was sold. The body to be weighed is suspended by the shorter arm of a lever, which turns on a fulcrum, and a weight is caused to slide upon the longer arm to produce equilibrium, its place upon this arm indicating the weight. The upper edge of the longer arm is notched to a graduated scale.

STEEN (stan), Jan, painter, born at Leyden, Holland, in 1626; died Feb. 3, 1679. He studied art at Utrecht and afterward at The Hague and in 1646 settled at Leyden. His productions are very numerous and have had a marked influence upon art in the Netherlands. Many galleries of Europe have specimens that show a close acquaintance with nature, some of them giving evidence of dramatic feeling. Among the most important are "The Music Lesson," in London; "The Marriage Contract," Brunswick; "The Menagerie," The Hague; "The Painter's Family," Amsterdam; and "Dissolute Company," Berlin.

STEIN (stīn), Heinrich Friedrich Carl, Baron von, statesman and author, born in Nassau, Germany, Oct. 26, 1757; died in West-phalia, June 29, 1831. After studying in the public schools, he entered the University of Göttingen and in 1778 enlisted in the Prussian military service. He was made director of the department of mines for Westphalia in 1784, and several years later visited the mining regions of various parts of Europe with the view of introducing more modern methods in the district under his supervision. In 1797 he was made president of the Westphalian chambers and in 1804 became minister of imposts, taxes, and manufactures for Prussia. In that capacity he brought about many reforms, among them the merit system in civil service, the abolition of serfdom, better systems of city government, and an extension of government interest in constructing public works. The rapidity with which Napoleon rose in power brought Stein in opposition to the development of French interests, and he was compelled to resign in 1808 and retire to Austria. Napoleon confiscated his property, but Stein proceeded to Russia in 1812, where he aided Emperor Alexander in planning for the final overthrow of Napoleon. When the allied army marched into Saxony, he became president of the council of the German Confederation and continued an important factor until after the overthrow of Napoleon, when he retired from public service. His writings include "Political Testament," "Monuments of German History," and numerous official and historical documents of Germany. In Nassau and Berlin are monuments erected to his memory.

STEINBOCK (stīn'bok), a small antelope native to South Africa. It has a reddish color, a long neck, and slightly curved horns. At the shoulder it measures about 24 inches. The flesh is highly nutritious, for which it is hunted by natives and Europeans. It is found chiefly in thinly wooded and hilly places. The ibex of Europe is commonly called steinbock among the Germans.

STELVIO (stěľvě-ō), Pass of, a celebrated carriage road in Europe. It is located across the Tyrol Alps between Italy and Austria, and forms a part of the highway between Innsbruck and Milan. This roadway was completed in 1828 under franchise by the Austrian government, and is still noted for its fine construction and the beautiful scenery of the region which it traverses. It passes over heights 9,076 feet above the sea and is 33 miles long.

STEM. See Plants.

STENCIL (stěn'sĭl), a pattern for printing letters and ornamental designs, usually made of thin brass or cardboard. The stencil contains the designs to be produced, these being cut by machinery, and in marking it is laid on the surface which is to receive the design. paint is applied by means of a brush after the stencil has been properly adjusted, and in this way it is possible to produce ornamental work very rapidly. Rubber stamps are now used largely for lettering, though previously stencils were employed for that purpose, and the latter are used where the designs are larger than can be produced by stamping.

STENOGRAPHY (ste-nog'ra-fy). See

STEPHEN (ste'ven), King of England, born at Blois, France, in 1105; died Oct. 25, 1154. He was the second son of Stephen, Earl of Blois, and Adela, daughter of William the Conqueror, and nephew of Henry I. of England. As Stephen was a titled nobleman of Normandy, he received large estates in England. He took the oath to aid in the succession of the daughter of Henry I., Empress Matilda, to the throne of England, but on the death of his uncle, in 1135, he claimed the throne. At that time he hastened to Britain and was crowned on Dec. 23, 1135, but Matilda landed in England in 1139 and with the support of her half-brother, the Earl of Gloucester, she conducted a successful civil war. Stephen was made a prisoner in 1141 and Matilda was proclaimed queen, but an insurrection soon arose

against her government, which terminated in her being made a prisoner at Winchester Castle. The Earl of Gloucester was imprisoned and soon after was exchanged for Stephen, thus supplying the conditions that continued the war. Matilda having escaped from imprisonment, she retired in 1147 to Normandy, and the war was prolonged in her behalf by her son Henry. The Treaty of Wallingford brought the struggle to an end, in 1153, the agreement being that Stephen should remain king until his death, when Henry should succeed to the throne, which he did on Oct. 25, 1154, as Henry II. By this agreement the Anglo-Norman line ended, and the throne passed to the Plantagenet dynasty.

STEPHEN, the name of ten popes of Rome, who reigned within the period between 253 and

1058. See Pope.

STEPHEN, Sir Leslie, critic and author, born in London, England, Nov. 28, 1832; died Feb. 22, 1904. He was educated at Eton and King's College, London, and Trinity Hall, Cambridge, graduating from the last mentioned institution in 1854. Shortly after graduation he was made a fellow at Trinity Hall, where he remained until 1864, when he removed to London to engage in literary work. In 1865 he published a work entitled "Sketches from Cambridge," which had formerly been printed in the Pall Mall Gazette, and in 1871 he became editor of the Cornhill Magazine. After serving efficiently about ten years as editor of that periodical, he resigned in 1892 to become editor in chief of the Dictionary of National Biography, for which he wrote about 400 articles, including the biographies of Hume, Burns, Scott, Addison, Byron, Pope, Swift, Gibbon, Thackeray, Fielding, and Wordsworth. He held the Clark lectureship of English literature at Cambridge in 1893. His first wife, Harriet Marian, who died in 1875, was the younger daughter of William M. Thackeray. Edward VII. knighted him in 1902. His principal publications include "Essays on Free Thinking and Plain Speaking,"
"Hours in a Library," "Science of Ethics," "History of English Thought in the Eighteenth Century," "Life of Sir James Fitzjames Stephen." "Studies of a Biographer," "Life of Henry Fawcett," "Social Rights and Duties," and "English Utilitarians."

STEPHENS (stē'věnz), Alexander Hamilton, statesman, born near Crawfordville, Ga., Feb. 11, 1812; died March 4, 1883. After attending the common schools, he studied law and was admitted to the Georgia bar in 1834. He practiced law successfully, was elected to the Georgia Legislature in 1836, and from 1843 to 1859 served as a Whig in the United States Congress. He supported Douglas in his slavery policy and in 1860 strongly opposed secession, delivering at several times important speeches in favor of the union. However, when his State seceded, he embraced the policy of the Confederate States and served as Vice President

from 1861 to 1865. He was one of the leading statesmen of the Confederacy and in 1865 was imprisoned for five months at Fort Warren

in Boston Harbor. Shortly after his release he was elected a United States Senator from Georgia, but was refused a seat because his State had not complied with the conditions of reconstruction. In 1875 he became a member of the House of Representatives, in which he served until 1882, when he was elected



ALEXANDER H. STEPHENS.

Governor of the State of Georgia. He published a valuable work in two volumes, entitled "Constitutional View of the War Between the States."

STEPHENS, John Lloyd, author and traveler, born in Shrewsbury, N. J., Nov. 28, 1805; died in New York City, Oct. 10, 1852. In 1822 he graduated from Columbia College and soon after established a successful law practice in New York City. Failing health caused him to undertake an extensive trip to Europe, in 1834, and before returning to America he traveled through Egypt and Asia Minor. The accounts of his travels were made public in book form in 1837, under the title "Incidents of Travel in Egypt and the Holy Land," and the following year he published "Incidents of Travel in Greece, Turkey, and Russia." He was commissioned by the United States government, in 1839, to negotiate a treaty with the governments of Central America, and soon after published "Incidents of Travel in Central America, Chiapas, and Yucatan." In 1841 he made a second tour of Yucatan in company with Frederick Catherwood, and subsequently became associated with the enterprise of building a railroad line across the Isthmus of Panama. His latest published work is based on his second tour in Yucatan, entitled "Incidents of Travel in Yucatan," in which he made a valuable statement of facts regarding the monuments and other antiquities of that region. He superintended the Panama railroad construction work from 1849 until his death.

STEPHENSON (ste ven-sun), George, eminent inventor, born near Newcastle, England, June 9, 1781; died Aug. 12, 1848. He descended from parents in very moderate circumstances, and was first employed to herd cows at four cents a day. Subsequently he worked in gardens at eight cents a day. In 1796 he was employed to tend a colliery engine at a salary of \$3 per week, and while serving in that capacity he studied the elementary branches of learning at odd times in the engine room. After making some progress in these studies, he turned his

attention to an investigation of the machinery with which he was associated, and when twenty years of age secured the situation of brakeman.



GEORGE STEPHENSON.

to the duties caused his promotion to the position of enginewright at Killingworth in 1812, where he received a salary of \$500 a year. While there he was given permission by Lord Ravensworth to construct a traveling engine for the tramroads

Close application

between the colliery and the port, nine miles distant. He successfully completed a locomotive in 1814 and named it My Lord.

This invention proved so successful that he was able to induce the projectors of a railway between Stockton and Darlington, who had designed to use horses for propelling their wagons, to adopt his locomotive and he was made engineer. The success of the enterprise caused his employment in the construction of a railway between Liverpool and Manchester, receiving for his services a salary of \$5,000 a year. A locomotive made by him and his son Robert, called the Rocket, was accepted by the company, and on a trial trip in 1830 developed a speed of 29 miles an hour. Thus, Stephenson became the originator of the railway to carry freight and passengers, and soon after his first successes railroads began to develop in all parts of the civilized world. He made a visit to Belgium and Spain in 1845 and was attacked by pleurisy, from which he never fully recovered. His last years were spent on his country seat at Tapton, where he utilized his wealth by causing the planting of gardens and orchards, and enjoying the quiet and beauty of his home.

STEPHENSON, Robert, eminent engineer, born at Willington Quay, near Newcastle-upon-Tyne, England, Oct. 16, 1803; died Oct. 12, 1859. He was the only son of George Stephenson. After attending school in Newcastle he secured an education at the University of Edinburgh. In 1823 he assisted his father in surveying the first railway built from Stockton to Darlington and in 1824 went to Mariquita, South America, to spend three years under an engineering appointment. After returning to England by way of Canada and the United States, he aided in building the Rocket at his father's locomotive works, and subsequently became managing engineer of the London and Birmingham Railway. Among the enterprises projected by him are the bridge across the

Saint Lawrence at Montreal, two bridges across the Nile at Damietta, and the Britannia tubular bridge. He was made a member of Parliament in 1847, received the cross of the Legion of Honor from France in 1855, and shortly after was given a degree by the University of Oxford. His remains were buried with elaborate ceremony in Westminster Abbey. He published "Report on the Atmospheric Railway System" and "Description of the Locomotive Steam Engine System."

STEPNIAK, Sergius Michael Dragomanoff, eminent revolutionist and author, born in Ukraine, Russia, in 1841; died in London, England, Dec. 23, 1895. The name by which he is known is his pseudonym, his real name being Kravthehinski. He descended from a Cossack family, studied at Kieff, and was made an instructor of history in the University of Kieff in 1865. Subsequently he became politically offensive to the government for advocating greater liberty. He was removed as instructor from the university in 1873 and three years later fled to Switzerland. In 1885 he found refuge in London, where he devoted much of his time to literary work. His principal publications include "Underground Russia," "Internal and External Turkey," "The Career of a Nihilist," "Russia Under the Czars," and "Russian Internationalism."

STEPPES (steps), the name applied by the Russians to the plains occupying a part of Siberia, stretching across Southeastern Europe as far west as the Dnieper. These plains have a generally undulating surface with occasional ranges of low hills, and are mostly treeless and quite barren. In many places fertile regions of greater or less extent abound. Nutritious grasses cover most of the surface in the spring, but during the dry season of summer and fall the greater part is extremely arid and barren. A large part of this region is occupied by nomadic Tartars.

STEREOSCOPE (stē'rē-ō-skop), an instrument whose purpose is to aid in attaining vision of a pair of properly prepared pictures, which together compose the stereograph. first form of this instrument was invented by Sir Charles Wheatstone in 1838, but subsequently many improvements were made, and there are at present several forms of it in extensive use. The common stereoscope has a double lens, or a pair of half-lenses, set in a small box, and through these the eyes of the observer look upon two pictures stationed at the proper focus some distance from the box. Photographs taken for use in instruments of this kind are from two aspects, one as seen with the right eye and the other as seen with the left, and they are placed in a transposed position on a cardboard fitted to be held in a frame. When brought into focus, the instrument makes the two images blend into one, and they appear to the observer as only

one image, which, however, is greatly intensified.

STEREOTYPE (stere-o-tip), the name commonly applied to a plate made from a plaster or papier-maché mold, which is used in printing instead of movable type. Johann Müller, a German pastor in Holland, is credited with the distinction of having successfully produced the first solid plate for use in the printing press, which he did by setting the type and afterward applying a mechanical composition to form a solid mass. This process was utilized to a considerable extent in printing successive editions of various publications, thus economizing greatly in time and the expense usually incurred in setting up movable type with the reissuance of books and pamphlets. William Ged (1690-1749), a goldsmith of Edinburgh, invented a plaster process by which type once set up could be reproduced. He had been employed, in 1731, by the University of Oxford to manufacture plates for Bibles and prayer books, and having seen the utility of Müller's invention, he was instrumental in adding considerable value to the printer's art by originating stereotyping proper. In this process the type is set up in the usual way and the face is oiled with a brush. Plaster of Paris is moistened and made of the proper consistency and poured over the type, and, on being dried, forms a mold corresponding to the face of the type. This mold may be used to secure any number of stereotype plates, thus saving the expense of resetting type for successive editions of books.

Though used to some extent, the Ged method has been almost entirely superseded by an invention of Gerroux, a Frenchman, who in 1829 discovered the papier-maché process. Besides being cheaper, it is much more rapid than any other yet discovered. It is due to this invention that publishers have been enabled to attain the present rapidity of issuing daily newspapers and other periodicals. The type is set in the ordinary way and the form is locked up, after which it is brushed and carefully oiled. Several folds of soft paper are dampened and pasted together, and, after being placed on the type, they are beaten with a stiff brush so as to come in contact with every part of the type-face. A blanket is then spread over the top and it is placed in a steam-heated press, where it is thoroughly dried under pressure, after which the paper matrix is used as a form to cast the stereotype. It is possible to use a paper matrix several times. In newspaper offices using cylinder presses the stereotypes are made in form to fit the cylinder. The art of stereotyping has developed to such a high state of perfection that it is possible to have the stereotypes ready for the printing press in five to eight minutes

after the forms are completed.

STERLING (ster'ling), a city of Illinois, in Whiteside County, on the Rock River, 110

miles west of Chicago. It is on the Chicago and Northwestern and the Chicago, Burlington and Quincy railroads. The Rock River supplies an abundance of water power, thus making it a center for the manufacture of machinery, furniture, paper, gas engines, wire nails, and farming implements. Among the principal buildings are the high school, the public library, the hospital, and many churches. It has well managed systems of waterworks and sanitary sewerage. The surrounding country is agricultural and stock raising. Sterling was platted in 1836 and in 1857 it was incorporated as a city. Population, 1900, 6,309; in 1910, 7,467.

STERNBERG (stern'berg), George Miller, surgeon and bacteriologist, born in Otsego County, New York, June 8, 1838. He graduated at the College of Physicians and Surgeons, New York City, in 1860, and the following year was appointed assistant surgeon in the United States army. After serving throughout the Civil War, he was assigned to various posts and in 1875 was promoted to the rank of surgeon and major. He was sent to Havana, Cuba, to study the yellow fever epidemics. During the war with Spain, in 1898, he had command of the medical service. He published "Manual of Bacteriology," "Malaria and Malarial Diseases," and "Immunity and Protective Inoculations." He died Nov. 3, 1915.

STERNBURG, Hermann Speck von, diplomat, born in Leeds, England, Aug. 31, 1852; died Aug. 24, 1908. He studied in Germany, giving special attention to political economy, international law, and military and naval sciences. He served in the German army throughout the Franco-German War, taking part with the Saxon dragoons, and in 1885 became military attaché of the German legation at Washington, D. C. In 1890 he was transferred to be secretary of the legation at Peking, China, and received a similar position on the German embassy at Washington in 1898. During the same year he was high commissioner of the Samoan affair, and in 1903 became minister plenipotentiary and envoy extraordinary at Washington. In the same year he was made ambassador of Germany to the United States. He received many decorations for eminent military and political services, including several from Germany, Austria, and Russia.

STERNE (stern), Laurence, humorist and author, born in Clonmel, Ireland, Nov. 24, 1713; died March 18, 1768. He was the son of an English officer stationed in Ireland. After studying at Cambridge, where he received a degree in 1736, he became a clergyman. In 1738 he received a charge near York and soon began to devote a part of his time to literary work. He published "Life and Opinions of Tristram Shandy" in 1759, which immediately attained a high repute on account of its interesting style and elegant humor. The first two yolumes were succeeded in the latter part of

the same year by two others. The fifth and sixth volumes appeared in 1762, the seventh and eighth in 1764, and the ninth in 1766. In the meantime he published four volumes of sermons and in 1768 issued "Sentimental Journey Through France and Italy."

STETHOSCOPE (stěth'ô-skōp). See Auscultation.

STETTIN (stět-tēn'), a seaport city of Germany, capital of Pomerania, eighty miles northeast of Berlin. It occupies a commanding position on the west bank of the Oder River, about thirty miles from the Baltic Sea, and is noted as a railroad center. Opposite the city are the two former suburbs of Lastadie and Silberwiese, with which it is connected by two substantial bridges. The important buildings include those occupied by the government officials, the Church of Saint Peter, a Gothic structure founded in 1124, the city hall, the citadel, the central railroad station, and many fine school and church buildings. Other features include the Berliner Thor and many monuments. The streets are substantially paved with stone and asphalt and are regularly platted. Stettiner Haff is an expansion of the Oder River north of the city and has an area of 200 square miles. It is an important waterway, having deep-sea and excellent canal connections. The city of Stettin has long been an important port. It was an influential member of the Hanseatic League. From 1648 until 1720 it was occupied by the Swedes and was a French possession from 1806 to 1813. Population, 1905, 224,119; in 1910, 236,145.

STETTINIUS, Edward R., financier, born at St. Louis, Mo., Feb. 15, 1865. He studied at the University of St. Louis and removed to Chicago, where he operated on the board of trade, purchasing and selling grain. In 1893 he engaged in manufacturing enterprises, first in making water tube boilers and later in matches, and in 1909 became president of the Diamond Match Company. Subsequently he removed to New York and became a partner in the firm of J. P. Morgan and Company. At the time the United States entered the Great European War, in 1917, he was made surveyor general of purchases in the war department, in which position he was a very potent aid to the government.

STEUBEN (stū'běn), Frederick William August, Baron von, eminent general, born in Magdeburg, Germany, Nov. 15, 1730; died at Steubenville, near Utica, N. Y., Nov. 28, 1794. He studied at Neisse and Breslau and served as a volunteer under a command of his father at the siege of Prague, in 1745. After remaining with the Prussian army throughout the Seven Years' War, he became adjutant general and was made aid to Frederick the Great, in 1762. Subsequently he retired from military service, receiving a lucrative government position, and was made a baron. In 1777 he sailed for America to assist the colonists against the

British. He was appointed a major general and later inspector general of the American army. While in that capacity he organized and disciplined the forces in such an efficient manner that he was accorded the thanks of Congress.

Much of his active military service was in New Jersey and the Carolinas. Steuben was a member of the court-martial on the trial of Major André. Subsequently he checked the invasion of Connecticut by Benedict Arnold and was present at Yorktown Cornwallis when surrendered. In 1790 Congress granted

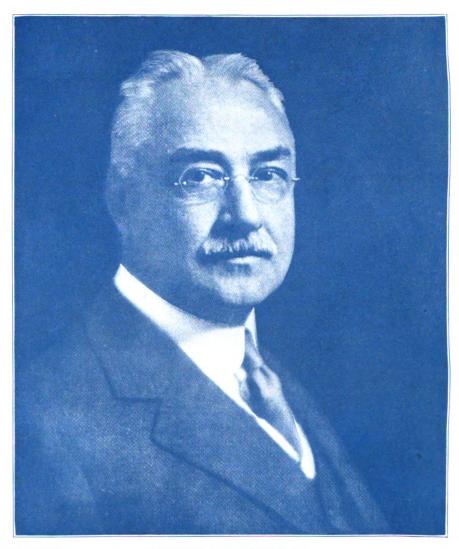


him a township of land near Utica, N. Y., a pension of \$2,400, and several tracts of land in Virginia and Pennsylvania. He settled on his land in New York, where he was resident at the time of his death.

STEUBENVILLE (stū'ben-vĭl), a city in Ohio, county seat of Jefferson County, on the Ohio River, 62 miles below Pittsburg. It is on the Pittsburg, Cincinnati, Chicago and Saint Louis, the Pennsylvania, and the Wheeling and Lake Erie railroads. In the vicinity are productive coal mines and gas wells, giving it material advantage for manufacturing. Among the noteworthy buildings are the county courthouse, the Gill Hospital, the Carnegie Library, the city hall, the high school, and the Y. M. C. A. building. It has Stanton Park and Altamont Park. It is the center of a large trade in coal, merchandise, and farm produce. The manufactures include pottery, glass, furniture, iron, white lead, paper, cotton and woolen goods, and machinery. Among the municipal facilities are gas and electric lighting, pavements, waterworks, sewerage, and street rail-The city occupies the site of Fort Steuben, which was founded and named for Baron Steuben in 1787. Population, 1900, 14,349; in 1910, 22,391.

STEVENS (ste venz), Alfred George, sculptor, born in Blandford, England, Jan. 28, 1818; died in London, May 1, 1875. He was the son of a house decorator and developed ability in designing while aiding his father. In 1833 he went to Italy, where he remained nine years and a part of the time received instruction from Thorwaldsen. He taught architectural drawing in the London School of Design from 1845 to 1848 and subsequently devoted most of his time to decorative modeling. His best work in sculpture is the monument to Wellington for Saint Paul's Cathedral, London, which is classed among the most noted productions of the last century.

the last century.



(Opp. 2742.) EDWARD J. STETTINIUS.

Edward J. Stettinius is the "World's Greatest Buyer." In 1917 he was made Surveyor General of Purchases in the War Department at Washington, D. C., and in 1918 was appointed First Assistant Secretary of War.

STEVENS, Thaddeus, statesman, born in Danville, Vt., April 4, 1792; died in Washington, D. C., Aug. 11, 1868. After graduating from Dartmouth College in 1814, he settled at Lancaster, Pa., to practice law, and was soor after elected as a Whig to the State Legislature In 1849 he became a member of Congress, serving in that body as an influential representative until 1853, and was a distinguished opponent of the Compromise of 1850, including the Fugitive Slave Law. He went with the northern Whigs into the Republican party and was elected to Congress in 1859, where he retained membership until his death. During that period he was one of the most influential leaders on the floor of the house and as such urged emancipation, the adoption of the Fourteenth Amendment to the Constitution, and the impeachment of President Johnson. Though bitter in his attacks upon those differing from him, he was a man of deep charity and strong influence. He gave a part of his estate to establish an asylum for orphans at Lancaster.

STEVENSON, Adlai Ewing, statesman, born in Christian County, Kentucky, Oct. 23, 1835. His family removed to Bloomington, Ill., in 1852. After attending Central College, he studied law and in 1858 became an attorney in Woodford County, serving as State's attorney from 1864 to 1868. In the latter year he settled at Bloomington to practice his profession. He was elected to Congress as a Democrat in 1876 and was reëlected in 1878. President Cleveland appointed him first Assistant Postmaster General in 1885, and in 1892 he was elected Vice President of the United States. At the close of his term, in 1897, he was appointed commissioner on international bimetallism. In 1900 he was nominated for Vice President by the Democrats, but sustained defeat along with the national ticket, receiving 6,342,514 of the popular votes. He was nominated as a Democrat for Governor of Illinois in 1908, when he ran many thousand votes ahead of his ticket, but did not receive sufficient support to be elected. He died June 14, 1914.

STEVENSON, Robert, engineer, born at Glasgow, Scotland, June 8, 1772; died July 12, 1850. His father died at an early age and he worked with his stepfather, Thomas Smith, in the construction of lighthouses. In 1791 he was sent to erect a lighthouse on the island of Little Cumbrae and later was civil engineer in the construction of county roads. He is the inventor of a system of intermittent and flashing lights and the builder of the Bell Rock Lighthouse, of which he published an account in 1824.

STEVENSON, Robert Louis Balfour, novelist and essayist, born in Edinburgh, Scotland, Nov. 30, 1850; died Dec. 3, 1894. He descended from a family noted as lighthouse engineers and was intended by his father for the same profession, but early became interested in sketching

and literature. After studying at the University of Edinburgh, he was called to the bar, but instead of practicing law turned his attention to literary research. His first writings appeared in *Macmillan's Magazine*, but he suffered from poor health and went on several extended tours,

partly for the purpose of gaining strength and partly to enrich his mind. After proceed ing to France, he came to America and crossed the American continent in an emigrant train. He frequented several Californian resorts, spent much



ROBERT L. STEVENSON.

time in the Adirondack Mountains of New York, and in 1887 settled in Samoa. While in California, in 1879, he married a widow, and her son, Lloyd Osborne, became his companion and assistant. In Samoa he purchased an estate called Vailima, where he died.

The writings of Stevenson are very numerous, including poems for children, many essays, and excellent stories, all of which show remarkable power of discernment and excellence of style. Among his most noted writings are "Treasure Island," "Northern Lights," "Footnote to History," "Familiar Studies of Men and Books," "Memoir of Fleeming Jenkin," "Pentland Rising," "Travels with a Donkey in the Cevennes, "New Arabian Nights," "Prince Otto," and "Merry Men and Other Tales." His "Silverado Squatters," dealing with events in California, was completed in 1883, and his "Across the Plains," treating of his trip from New York to San Francisco, was published in 1892. His work entitled "Strange Case of Dr. Jekyll and Mr. Hyde" was written in 1886 and is a study of double-consciousness. It has been dramatized several times and made the subject of numerous lectures. His "Vailima Letters" was published shortly after his death. It is a production remarkable for its fine exhibit of the beauty and interest found by the author in the Samoan Islands.

STEVENS POINT, a city in Wisconsin, county seat of Portage County, 85 miles west of Green Bay. It is nicely situated on the Wisconsin River, on the Wisconsin Central and the Green Bay and Western railroads, and has a large trade in agricultural products, lumber, and merchandise. Among the principal buildings are the county courthouse, the Carnegie Library, the Polish normal school, and one of the State normal schools. The manufactures include flour, cigars, lumber products, railroad cars, leather, paper, ironware, and machinery. It has electric lights, pavements, street railways,

public waterworks, and several parks. Stevens Point was settled in 1836 and was chartered as a city in 1897. Population, 1910, 8,692.

STEWART (stū'ert), Alexander Turney, merchant, born near Belfast, Ireland, Oct. 27, 1803; died April 10, 1876. He studied at Trinity College, Dublin, but emigrated to the United States before graduating. For some time he taught school in the vicinity of New York City. In 1825 he established a dry-goods business and subsequently founded one of the largest stores in the world on Broadway Street, New York City. He had branch offices in many countries in Europe and employed about 8,000 persons in his business of manufacturing and selling. In 1876 he was sent as a commissioner from the United States to the exposition at Paris, France.

STEWART, Balfour, physicist, born in Edinburgh, Scotland, Nov. 1, 1828; died near Drogheda, Ireland, Dec. 10, 1887. He studied at Saint Andrews and Edinburgh University and in 1859 became director of the Kew Observatory. In 1870 he was made professor of physics at Owens College, Manchester, where he conducted important investigations regarding terrestrial magnetism and the relation between temperature and sun spots. He is regarded one of the originators of the theory of spectrum analysis. His writings include "Conservation of Energy," "Radiant Heat," "Physical Speculations on a Future State," and "Elementary Treatise in Physics."

STEWART, William Morris, lawyer and statesman, born in Lyons, N. Y., Aug. 9, 1827; died April 23, 1909. In 1848 he entered Yale, but did not complete the course by graduation. However, he was given the degree of master of arts in 1865. In 1850 he went to California to seek his fortune in the development of gold fields, where he read law and was admitted to the bar. He was appointed attorney general of California in 1854 and removed to Nevada in 1860, where he became connected with the company that developed the Comstock Lode. In 1861 he was a member of the Nevada territorial council and became a United States Senator in 1864, serving in that body until 1875, when he resumed the practice of law in Nevada. He was reëlected to the United States Senate in 1887, in 1893, and in 1899. Stewart was identified with the Republican party until 1896, when he supported Bryan and bimetallism. His publications include a number of speeches and ad-

STEYN (stin), Martinus Theunis, general and statesman, born in Winburg, South Africa, Oct. 2, 1857. He studied at Grey College, in Bloemfontein, and later at Wevente, Holland. Subsequently he took a course in law at London. Steyn was admitted to the bar in 1882, but immediately went to Bloemfontein to practice his profession, where he became state attorney in 1889. In 1893 he was made supreme judge of the Orange Free State and on March 4, 1896, became president of that country. During his administration a defensive alliance was made with the Transvaal Republic, the two republics agreeing to act conjointly in case of foreign interference. At the beginning of war between the Transvaal Republic and Great Britain his forces immediately entered the field. He proved his efficiency as a military commander in several decisive battles as well as in the capacity of statesman and jurist. In 1902 he was prominent as a factor in the peace conference.

STICKLEBACK (stik'k'l-bak), a genus of fish common to the fresh and salt waters of northern regions, so named from the sharp, free dorsal spines, usually ranging from two to fifteen. They are among the few fishes that build nests for the reception of the spawn, which is carefully guarded by the male until hatched and the young are capable of providing for themselves. The male assumes blue and red tints at the spawning season and actively invites females to deposit spawn in its nest until it is filled with ova, and when the young life appears it provides food for several days. The female deposits from 50 to 100 eggs, which are not confined to the nest of a single male, but distributed to the nests constructed by different individuals. Sticklebacks live only from three to four years and vary in length from two to three inches. The best known and most widely distributed species have three spines, two on the back and one beneath, and range from Maryland to Labrador. In several places off the shores of Europe and in some of the interior waters of England these fishes are so numerous that they are caught and used for manure. They are seldom eaten, though their flesh is not objectionable.

STICK-SEED, the popular name of a weed native to Europe, but now found in many places of America. The stem is hairy and about two feet high, and the small flowers bloom late in the summer. These plants produce seeds covered with small projections, hence are distributed by cattle and other animals. This weed grows in waste grounds and cultivated fields. Considerable care is required to eradicate it from cultivated land.

STILICHO (stil'i-kō), Flavius, Roman general and statesman, born about 359; slain at Ravenna, Italy, Aug. 23, 408 A.D. He descended from Vandal ancestors, his father being a captain of the imperial army under Emperor Valens, and at an early age entered the imperial service. Theodosius was so impressed with his military ability and accomplished manners that he sanctioned his marriage to his niece, Serena, and in 384 appointed him as ambassador to Persia, When the emperor, in 394, bequeathed the Eastern Empire to his son Arcadius and the Western Empire to his son Honorius, he made Stilicho the guardian of the latter, with authority to administer the affairs of state in his name, while 2745

Rufinus was made guardian of the former. Shortly after the death of Theodosius, he suppressed an uprising in Africa, and in 403 signally defeated Alaric at Pollentia. The marriage of his son to the daughter of Theodosius and that of his daughter to the son of Honorius were consummated as means to aid his family in succeeding to the imperial throne. When his pretensions were discovered and made known, they excited the opposition of Honorius, who began to plan the capture and destruction of him and his supporters. However, Stilicho made an alliance with Alaric, but was compelled to leave Rome for the purpose of repelling a barbaric invasion, and while absent the emperor caused the massacre of his friends. Shortly after his army revolted and he was compelled to flee to Ravenna, where he was slain by friends of the emperor. His sad death ended the long line of distinguished heroes who had defended Rome against the barbarians for 150 years, and within three months a horde of Visigoths under Alaric was at the gates of Rome.

STILL, Andrew Taylor, osteopath, born in Jonesboro, Va., Aug. 6, 1828; died Dec. 12, 1917. He studied at Holston College, Tenn., served as surgeon and major in the Civil War, as a volunteer from Kansas, and became the founder of osteopathy. In 1892 he was made president of the American School of Osteopathy at Kirksville, Mo. He published "Practice and Research," "Autobiography of A. T. Still," and

"Philosophy of Osteopathy."

STILLMAN, William James, author and painter, born in Schenectady, N. Y., June 1, 1828; died July 6, 1901. He graduated at Union College in 1848 and the following year went to England to study painting, where he was influenced by the Pre-Raphaelites. While in Europe he became an intimate friend of Louis Kossuth, the Hungarian revolutionist, who commissioned him to secure the crown jewels of Hungary. His publications include "On the Track of Ulysses," "Autobiography of a Journalist," "Billy and Hans," and "The Cretan Insurrection."

STILLWATER, a city in Minnesota, county seat of Washington County, on the Saint Croix River, 20 miles northeast of Saint Paul. It is on the Northern Pacific, the Chicago and Northwestern, and the Chicago, Milwaukee and Saint Paul railroads and has steamboat communications with the Mississippi by way of the Saint Croix River. An electric railway connects it with Saint Paul and Minneapolis. The noteworthy buildings include the county courthouse, the State prison, the public library, the high school, the city hall, the Federal building, the city hospital, and two convents. Fine scenery is afforded by the dalles of the Saint Croix, which extend thirty miles above the city. The manufactures include machinery, flour, cement, lumber products, barrels, farming implements, and ironware. It was settled in 1843 and incorporated in 1854. Population, 1910, 10,198.

STILTBIRD, or Stilt, a species of wading birds. It is so called because its legs, in proportion to the size of the body, exceed in length those of any other bird. The body is about the size of that of a snipe, while the bare part of the legs measures eight inches, thus enabling it to run with remarkable rapidity. It usually nests in the marshy margin of a swamp or pond, but in some instances, especially where the ground is very wet, it builds a platform in the weeds and rushes. Several well-marked species of stiltbirds are native to North America, but the black-necked stilt is the most widely distributed. It is a common bird in the northeastern part of North America, extending as far north as Nova Scotia. This species is fourteen inches long and has a white tail, red legs, and a black bill. A species called the white stilt is native to Africa and Europe.

STING RAY, a class of cartilaginous fishes of the ray family, so called from the sharp, bony spine that projects backward. These fish have a long whiplike tail, a smooth skin, flattened teeth, and a moderately broad body. About forty species have been described. They are common to the warmer seas and some inhabit the fresh waters of South America. The sting is not poisonous, but is capable of inflicting a painful wound. Some of the species are from ten to twelve feet long, hence are powerful in defending themselves against intruders.

STIRLING (ster'ling), a river port of Scotland, in Stirling County, on the Forth River, 28 miles northeast of Glasgow. It has railroad facilities and the harbor is safe and convenient. The manufactures include cordage, mineral oils, leather, soap, clothing, agricultural implements, textiles, and machinery. The surrounding country is agricultural and stock raising. Among the principal buildings is the castle on Castle Hill, an eminence rising considerably above the city. It was formerly a noted resort of the Stuarts. In 1452 James II. stabbed the Earl of Douglas in a room of this castle. In connection with the castle are buildings dedicated to James III., James V., and James VI. The East Church of Stirling was erected by James IV. in 1494 and is still in an excellent condition. Other important buildings include the Cowan Hospital, the Corn Exchange, the Smith Institute, and numerous educational and charitable institutions. Monk captured the place in 1651 and in 1745 it was unsuccessfully besieged by the Highlanders. Population, 1917, 18,942.

STIRLING, James Hutchinson, philosopher and author, born in Glasgow, Scotland, Jan. 22, 1820. After studying in the Glasgow University, he practiced medicine in Wales, but later took an advanced course in philosophy in Germany. In 1865 he published a philosophic work entitled "The Secret of Hegel," drawn largely from the works of the German philosophers, but it gave him considerable standing as a writer. He became a lecturer on natural theology at Edin-

burgh in 1888. Among his best known writings are "As Regards Protoplasm," "Philosophy of Law," "Community of Property," "Burns in Drama," and essays on Macaulay, Jerrold, Tennyson, and several other noted writers. He translated from the German "Text-Book to Kant" and Schwegler's "Hand-book of the His-

tory of Philosophy."

STIRLING, Sir Thomas, soldier, born in Scotland about 1735; died May 9, 1808. He entered the military service and in 1757 became captain in the Royal Highlanders. During the French and Indian Wars he served in America, taking part under Abercrombie at Lake George in 1758 and under Amherst at Lake Champlain in 1759. The following year he was at the siege of Niagara, took part in the invasion of Lower Canada, and subsequently was stationed at Fort Chartres, Ill. He served in the British army throughout the Revolutionary War, taking part in the battles of Brandywine, Long Island, and Fort Washington. In 1801 he was promoted to the rapk of a general

the rank of a general. STOCKBRIDGE (stok'brij), a town of Massachusetts, in Berkshire County, 16 miles south of Pittsfield. It is situated on the Housatonic River and the New York, New Haven and Hartford Railroad, and is surrounded by the Berkshire Hills. It is celebrated as the seat of an Indian mission established in 1736 for the benefit of the Stockbridge Indians, who were converted to Christianity under the teaching of John Sargent and Jonathan Edwards. These Indians numbered about 400 and their descendants are now living in the vicinity of Green Bay, Wis., where they engage largely in farming. Near Stockbridge, in the vicinity of Lake Mahkeenac, are the remains of the house in which Hawthorne wrote "The House of the Seven The town contains a monument of Gables." Jonathan Edwards, a park presented by Cyrus W. Field, and a public library. In the vicinity is a narrow gorge known as Ice Glen, where certain caves contain ice throughout the year.

Population, 1905, 2,265; in 1910, 1,933. STOCK EXCHANGE, an institution organized and maintained by brokers and capitalists, designed as a market for the purchase and sale of various securities, such as public stocks and shares. Institutions of this class are incorporated under the laws of the state where they are organized, and business is conducted on a cash basis. The New York Stock Exchange was founded in 1792 and is the largest and most important in America. Other important institutions of this kind are located at Philadelphia, Chicago, Toronto, Montreal, Boston, and San Francisco. The stock exchange of Chicago is one of the newest, but takes a high rank in the volume of business annually transacted. Stock jobbing is a speculative business on the stock exchange. It is concerned exclusively with time bargains, in which there is no transfer of stock, but simply a payment of the differences by the buyer or seller according to its value above or below the price named in the bargain, the settlement being made at the time previously specified. This business partakes of the nature of gambling in many stock exchanges, while in others it is not permitted, but the actual delivery of stock is required.

STOCKHOLM (stok'holm), the capital and largest city of Sweden, situated between Lake Mälar and the Baltic Sea, about 325 miles northeast of Copenhagen, Denmark. It occupies an attractive site on several islands and the adjacent mainland and is one of the most beautiful capital cities of Europe. Numerous substantial bridges connect the holms, or islands, with each other and with the mainland, and it has extensive steamboat and railroad facilities. The city was founded on an island at the mouth of Lake Mälar in the 13th century by Birger Jarl, when the government desired to make it the center of commercial enterprises with other towns of Sweden and Norway. Growth was slow until the beginning of the last century, when the building of railroads and dock improvements gave it a place as the most important commercial city of the Scandinavian peninsula. At present no European city has finer paved streets or is more carefully guarded as to sanitary regulations, while its public gardens, parade grounds, and other municipal improvements take very high rank. The streets are lighted by gas and electricity, have an excellent system of rapid transit, and are straight and regularly platted in the principal parts of the city. It has many beautiful public gardens, telephones, sewerage, and equestrian fountains. In the older quarters the pavements are inferior and the streets are narrow, but stone and brick are replacing the wooden structures.

Among the noteworthy buildings is the palace, a fine Italian structure dating from 1753, and near it is a statue of Gustavus III. Adjacent to the palace are numerous gardens, a gallery of paintings, a museum, and a splendid national library. Other buildings of note include the College of Surgery, the council house, the Saint Nicolai's Cathedral, the Church of Saint James, the observatory, and the Knight's Hall. The noteworthy statues include the one in the Hop Garden dedicated to Linnaeus, the statue of Gustavus Vasa near the Knight's Hall, and several others erected in honor of Swedish kings. Gustavsholm, the largest of the islands, is the most densely populated part of the city and has the finest buildings, while on Ship Island is the seat of the Swedish navy, and on Ladugaard's Island are romantic glens and picturesque heights. The city is well supplied with public schools, numerous scientific and benevolent associations, and a number of institutions of higher learning. Practically all the people are Protestants and members of the Lutheran Church. Illiteracy has been reduced to a remarkably low per cent. The manufactures include cotton textiles, woolen and silk goods, porcelain, leather, glass, ribbons, sugar, tobacco products, ironware, sailing vessels, steam engines, machinery, and hardware. Stockholm has a large export and import trade, steamboat connections being maintained with all the leading ports of the world. The Danes under Christian II. captured the city in 1520, when an atrocious massacre resulted. The Treaty of Stockholm, concluded in 1855, guaranteed the preservation of Swedish supremacy. Population, 1906, 332,738; in 1912, 345,168.

STOCKPORT (stok'port), a city of England, at the confluence of the Mersey and Thames rivers, five miles southeast of Manchester. It is at the junction of a number of important railroads, giving it a large trade in produce and merchandise. The chief manufactures are cotton and woolen goods, hardware, engines, spirituous liquors, and machinery. The surrounding country is fertile, supplying large quantities of cereals and live stock for its market. Among the principal buildings are the Saint Mary's Church, the free library, the free grammar school, and a museum. In Saint Peter's Square is a statue of Richard Cobden. Bituminous coal is mined in the vicinity. The Romans had a station on the site of Stockport, from which a town gradually developed that in 1644 was taken by Prince Rupert. Population, 1911, 108,693.

STOCKTON (stŏk'tŭn), a city in California, county seat of San Joaquin County, on the San Joaquin River, at the head of navigation. It is on the Southern Pacific and the Atchison, Topeka and Santa Fé railroads. The streets are well platted and substantially paved. It has systems of gas and electric lighting, sewerage, water-works, and electric railways. The noteworthy buildings include the county courthouse, the Federal post office, the public library, the Masonic Temple, the State hospital for the insane, the Saint Mary's College, the opera house, the Pacific Hospital, the high school, and the Saint Joseph's Home. Among the manufactures are flour, woolen goods, macaroni, carriages, ironware, wagons, and farming implements. It was founded in 1849 and incorporated as a city in 1850. Population, 1900, 17,506; in 1910, 23,253.

STOCKTON, Francis Richard, novelist, born in Philadelphia, Pa., April 5, 1834; died in Washington, D. C., April 20, 1902. He studied in the central high school of Philadelphia and engaged as an engraver and draughtsman, but in 1866 became a journalist. He wrote successively for the Philadelphia Post, Scribner's Monthly, and the Riverside Magazine, and was for a time assistant editor of Saint Nicholas. His short stories are very popular. They were first published in the Riverside Magazine and afterward collected under the title, "Ting-a-Ling Stories." In 1879 he published "Rudder Grange," a series of stories noted for their originality and quaint humor. Other writings from his pen include "Christmas Wreck," "The Lady or the Tiger,"

"The Hundredth Man," "The Adventures of Captain Horn," "Pomona's Travels," "The Bee Man of Orn and Other Fanciful Stories," "Mrs. Cliff's Yacht," and "The Story of Viteau."

STOCKTON, Robert Field, naval officer, born in Princeton, N. J., Aug. 20, 1795; died there Oct. 7, 1866. He was a grandson of Richard Stockton (1730-1781), a signer of the Declaration of Independence, and in 1811 entered the United States navy as midshipman. In the War of 1812 he took part in the defense of Baltimore, succeeding to the rank of lieutenant, and in 1821 was sent to Africa to take part in the war with Algeria and to aid in securing colonization rights in the republic of Liberia. After returning to America, he was engaged in private business in New Jersey from 1823 to 1838 and in the meantime promoted the construction of the Delaware and Raritan Canal. He reëntered the navy in 1838 and in 1845 was made commander of the Pacific squadron, taking possession of California for the United States government. Soon after he negotiated a treaty by which California was transferred from Mexico to the United States. He retired permanently from the navy in 1850, and from 1851 to 1853 served as United States Senator. In 1861 he was a member of the American Peace Congress that met in Washington.

STODDARD (stod'derd), Richard Henry, author, born in Hingham, Mass., July 2, 1825; died May 12, 1903. After attending the public schools of New York City, he worked in an iron foundry and in the meantime took an interest in privately studying literature. His first publication was issued in 1849, entitled "Foot Prints," and in 1852 he published a second volume of poems. He served in the New York customhouse from 1853 to 1870 and in the latter year became clerk to General McClellan. For ten years he was a literary writer for the New York World, and became literary editor of the New York Mail and Express in 1880. Among his poetic works are "Book of the East," "Songs in Summer," "The Lion's Cub," "The King's Bell," "The Children in the Wood," and "Life, Travels, and Books of Alexander von Humboldt." He edited Rufus W. Griswold's "Loves and Heroines of the Poets," "Poets and Poetry of America," and "Female Poets of America."

STODDARD, William Osborn, author and journalist, born at Homer, N. Y., Sept. 24, 1835. He graduated at the University of Rochester in 1857 and took up farming, but after three years engaged in newspaper work in Illinois. For some time he was editor of the Chicago Daily Ledger and became a volunteer at the outbreak of the Civil War. After serving three months, in 1861, he became private secretary to President Lincoln, and after three years was made United States marshal of Arkansas. After 1866 he devoted his time chiefly to literature and journalism, publishing a large number of poems, biographies, and works of fiction. Among his chief

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books are "Verses of Many Days," "Life of Abraham Lincoln," "Lives of the Presidents," "The White House in War Times," "The Red Patriot," "Success Against Odds," "The Spy of Yorktown," "Long Bridge Boys," and "The Swordmaker's Inn.

STOICS (sto'iks), the adherents of a speculative philosophy, known as Stoicism, which was first taught in Greece and later in Rome. The Stoic school of philosophy was founded by Zeno at Athens about 308 B. C., and was so called because its founder taught on a porch, or stoa, which became the gathering place of his disciples and friends. The Stoics drew their philosophy mainly from their predecessors, especially from Socrates and Aristotle. They taught that a rational soul is inherent only in man, and, though his body is formed quite like that of lower animals, he has reason and intelligence like the gods; hence, all his other faculties should be brought into subjection to reason. In their system only one God was recognized. He was regarded the father of all men and was thought to give unity, beauty, and adaptation to matter and force, the two ultimate principles of the universe. Their system eliminated as dangerous all that interfered with purely intellectual existence. In this their system possessed its chief merit, since a close observance of these tenets led man to subdue his passions and senses, and thus he became freed from all extravagances that might lead to mere sensual pleasure and operate only to gratify personal ends.

STOKES, Whitley, author and Celtic scholar, born in Dublin, Ireland, Feb. 28, 1830; died Apr. 13, 1909. He graduated at Trinity College, studied law in the Inner Temple, and in 1862 went to India to engage in the practice of While there he held several important positions under the government, drafted The Code of Civil Procedure, and became eminent as a Celtic scholar. Besides making a careful study of the early Irish, he made extensive investigations of the Cornish and British. His work has contributed largely to a better understanding of the ancient Irish language and the literature and history of the Irish people. Among his many works are "Three Middle-Irish Homilies," "Three Irish Glossaries," "Tripartite Life of Saint Patrick," "Old Irish Glosses at Würzburg and Carlsruhe," "Passion, a Middle-Cornish Poem," "Martyrology of Gorman," and "Lives of Saints from the Book of Sismore."

STOKE-UPON-TRENT, a city in England, on the Trent River, 14 miles north of Stafford. It is situated on the Trent and Mersey Canal and several railroads. Among the chief buildings are the public library, the Minton Memorial building, the townhall, and the Gothic church. It has statues of Wedgewood, Minton, and Colin Minton Campbell. Pottery is the chief manu-The place is famous for its production of ironware, porcelain, earthenware, brick, and machinery. The surrounding country is fertile, producing cereals and fruits. It has valuable deposits of bituminous coal. The place was incorporated in 1874. Population, 1911, 254,553.

STOLA (sto'la), a long garment worn over the tunic by the women of ancient Rome. It extended to the ankles, had a flounce below and broad folds above the breast, and was secured to the body by a girdle. Courtesans and women who had been divorced from their husbands were not permitted to wear the stola.

STOMACH (stum'ak), a dilated part of the alimentary canal, serving as one of the princi-pal organs of digestion. The human stomach is somewhat pear-shaped and has a capacity of about three pints. It is situated on the left side of the abdomen, under the diaphragm, and the esophagus opens into it from above. The esophagus forms the tube through which the masticated food enters. An opening called the pylorus, a constriction near the smaller extremity of the stomach, allows passage into the small intestine, which has its beginning at that part of the alimentary canal. The stomach is composed of four layers: the serous, the muscular, the areola or submucous, and the mucous coats. The outer, or serous, layer is thin, transparent, and smooth, and is a part of the lining of the abdomen. The fibers of the muscular layer are arranged lengthwise, obliquely, and circularly. The areola coat, or submucous layer, contains blood vessels and lymphatics. The mucous coat, or inner layer, is provided with multitudes of glands, which secrete the gastric juice. This fluid is colorless and watery. It has a sour taste and odor and contains hydrochloric acid and a ferment body called pepsin. The function of the stomach is to aid in digestion, and, when food enters, the gastric juice is poured out freely to change the insoluble proteids into soluble and diffusible substances, called peptones.

Muscular contractions serve to churn the contents of the stomach and thoroughly mix the food with mucus and juice, thus reducing it to a creamy fluid called chyme, which passes into the small intestine through the pylorus. This motion is independent of the will, and upon its vigorous action depends in a large measure healthful digestion. It is highly essential that the hygiene of the stomach be carefully observed, since health and bodily strength depend in a large measure upon healthful digestion. Its work is facilitated by chewing the food with care so as to mix it thoroughly with saliva. A large quantity of liquids taken at the time of eating dilutes the gastric juice, and cold water tends to check its flow for a time. A short period of rest just preceding and following a meal is healthful, and regularity in eating is likewise important, since a lapse of five to six hours between meals gives the stomach a brief period of rest. Persons with weak stomachs should be careful in the selection and preparation of their food, for the reason that skillful cookery and the choice of easily

digested varieties are helpful.

Many animals have stomachs constructed quite similarly to that of man, but in others it is very different. In the kangaroo the stomach has two elongated sacs, in the camel it is divided into two compartments by a muscular band, in birds there are three small but distinct dilations of the alimentary canal, and in reptiles the stomach is a mere modification of the esophagus. Most invertebrates have a digestive tract with functions similar to those of the stomach in vertebrates. Among the diseases of the stomach are

gastritis, cancer, and dyspepsia.

STONE, the name applied to all solid mineral substances, such as clay, lime, silex, and the rocks obtained by quarrying. The last mentioned include granite, limestone, marble, slate, and sandstone, all of which are used extensively for building purposes. Durable stones were esteemed highly as material for construction work in ancient times, and their use has been extensive in all periods of history for building aqueducts, bridges, and edifices. Indeed, the ancients possessed the power of quarrying and moving stone as large as any transported in modern times, and in some cases complete structures were hollowed out of single blocks and transported long distances. Herodotus describes such a structure completed on the Isle of Elephantiné and transported by Amasis to Sais, a distance equal to the ordinary sailing of twenty days. It was about 10 feet high, 18 feet wide, and 27 feet long, outside measurement, and the room within was 24 by 15 feet and 6.6 feet high. It is estimated that the weight was 9,944,750 pounds. The largest mass of stone that has been transported in modern times is the pedestal of the statue of Peter the Great at Saint Petersburg, which weighs 3,234,000 pounds. After finding that rollers made of wood and iron were insufficient to transport this immense mass of stone, balls made of an alloy of tin, copper, and zinc were used.

Granite is the most durable stone under exposure to the weather, as in monuments and the outer walls of buildings. Sandstone is used extensively for architectural structures, but it disintegrates in climates where the atmosphere is alternately dry and wet, or warm and extremely cold. This is true likewise of marble, but this stone is an excellent material for finishing and decorating the interior. Slate is employed extensively for roofing. In modern times artificial stone made in the form of a concreted material is used extensively, especially in vases, tiles, building blocks, sidewalks, sewer pipes, tunnels,

and bridges. See Concrete.

STONE, Lucy, reform advocate, born in West Brookfield, Mass., Aug. 13, 1818; died Oct. 18, 1893. She graduated from Oberlin College in 1847 and immediately engaged as a lecturer for the American Antislavery Society. In 1855 she married Henry B. Blackwell, but under a previously contracted agreement retained her maiden name. She lectured extensively on

woman suffrage and in 1869 was one of the organizers of the Woman's Suffrage Association. The following year she became an active contributor to the Boston Woman's Journal and until 1882 traveled in nearly all the states, lecturing and organizing local societies. She took high rank both as a writer and an advocate in reform movements.

STONE AGE, the term applied to a period of time, or a condition of civilization, which is marked by the use of tools and weapons made of stone, instead of metals. When employed in this sense the term age does not imply a fixed number of years, but signifies a period of time in which certain conditions existed, and the period covered may be of long or short extent, or of early or recent occurrence. Besides, the stone age is of variant length and confined to different periods in the history of peoples not closely associated. For instance, the stone age is thought to have ended in Europe about the year 1200 B. C., while it existed among the Eskimos of the extreme north up to the latter part of the last century, and it still continues among the islanders of the South Pacific. Some writers have divided the stone age into two periods, known as the paleolithic, or earlier, and the neolithic, or later. This distinction is made because the implements of the paleolithic age are found with the remains of animals now extinct, while the remains of tools of the neolithic period occur with animal remains resulting from species represented by living forms. The former are different in that they are rudely constructed and entirely of flint, while the latter are finely formed and polished and in many cases they are made of various kinds of stone.

Implements of bone occur in both periods of the stone age, but their construction is marked by greater fineness in the later period. Among the implements are arrowheads, daggers, spears, ax-hammers, knives, borers, saws, chisels, scrapers, and hatchets. Highly polished axes of fibrolite and jade have been found in the vicinity of Lake Constance, Switzerland, and near Breslau, Germany. The American Indians left many remains of stone implements, especially axes, hammers, hatchets, spears, arrowheads, and utensils for performing domestic work. Many elaborate collections of remains of this kind have been made, one of the most noted being in the State historical building at Des Moines, Iowa. A large number of remains of the stone age have been secured from the mounds of the Mississippi valley and from the cave dwellings in New Mexico and the surrounding regions. Excavations and explorations of mounds and caves have led to the conclusion that the primitive peoples practiced agriculture, reared domestic animals, and possessed apparatus for catching fresh-water and deep-sea fishes. The stone age was succeeded by the bronze age and that again by the iron

STONECHAT, a bird of the warbler family,

native to the region extending from Central Europe to the northern part of Africa. It has a short bill and long and rounded wings. The male is finely colored, being chestnut in front and lighter backward. The female is somewhat smaller in size and duller in coloring. This bird is migratory on the continent of Europe, moving southward in winter, but remains throughout the year in England.

STONE CIRCLES, or Standing Stones, a class of monuments used by prehistoric people to indicate their burial grounds, of which traces still remain in many regions. In some places several stones were set upright to indicate an isolated grave, and in others a complete circle of stones was erected to inclose a burial ground. Remains of this kind are called cromlechs in France, Druidical circles in Britain, and domrings in Scandinavia, but all show more or less relation as to time and circumstances. It is thought that these remains date from the bronze age. A remarkable instance is on the Orkney Islands, north of Scotland, where an ancient stone circle is surrounded by a trench six feet deep and thirty feet wide. It originally inclosed two and a half acres, and about a dozen stones from six to fourteen feet high are still standing.

Stonehenge is the name applied to an extensive group of standing stones in Salisbury Plain, about seven miles north of Salisbury, England.



STONEHENGE IN SALISBURY PLAIN.

which is shown in the illustration. It consists of a large central stone, around which are two circles and two ovals. The inner circle consisted originally of about forty stones, which were six feet high, and the outer of about thirty upright stones with an equal number of blocks placed across the top. The two circles are about nine feet apart and at present 43 stones still remain, though fifteen have fallen or were broken down. Besides these, a number of the stones forming the two ovals are still to be seen. The largest stones are fifteen feet above the surface of the ground and indicate that they were hewn and brought from a distance. It is thought that they are of Druidical origin, but writers differ as to the period from which they date, some placing their construction one hundred years before Christ and others in the 5th century of our era. Few traces of such remains are found in South Europe and North Africa.

STONEHAM (ston'am), a town of Massachusetts, in Middlesex County, 9 miles north of

Boston, with which it is connected by the Boston and Maine Railroad. The features include the high school, the public library, the townhall, and the public park. It has manufactures of boots and shoes, leather, boxes, and machinery. The place was settled in 1670, but remained a part of Charlestown until 1725, when it was incorporated under the present name. Population, 1905, 6,320; in 1910, 7,090.

STONES. See Geology.

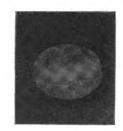
STONES, Precious, the term applied to rare and beautiful stones, often used as a synonym of gems, but the latter is more properly the name of precious stones after they have been engraved or cut to form articles of ornament. There are three general classes of precious stones and these are found widely distributed in many parts of the world. They include the carbon, alumina, and silica classes. The diamond is the only precious stone of the carbon class. being made up of pure carbon, and is the hardest of the precious stones. Stones of the alumina class are properly called sapphires. They are composed of pure alumina, but are colored differently, and include the true sapphire, the oriental topaz, the oriental amethyst, the oriental ruby, and the oriental emerald. To the silica class belong the opal, the amethyst, and the agates, which include the onyx, carnelian, chalcedony, sardonyx, and bloodstone. Precious stones of the silica class are formed chiefly of silica, and those closely related to the silica and alumina classes are the true topaz, true emerald, garnet, jasper, and tourmaline. Several substances derived from plants and animals are employed to a vast extent in making jewelry and for ornamental purposes. They embrace a fossil resin called amber and pearl, coral, and various shells.

Diamond, ruby, sapphire, and emerald are the most valuable of precious stones. To bring out the sparkle and luster it is necessary to cut and polish them with considerable care. Fine effects are obtained by making what are known as cameos and intaglios, the former having the design above the general surface and the latter having the design sunk below the surface. The best result in securing the finest color effect is obtained by cutting the surface smooth and rounded, while, on the other hand, the sparkle is brought out most prominently by cutting to form many faces or facets. Besides its use for ornamental purposes, the diamond has much value in cutting glass, other diamonds, and various stones. They are employed extensively for jewels in watches. Very beautiful imitations of precious stones are made of glass, called strass, or paste. It may be given a very fine color effect, with the result that it very closely resembles several kinds of the genuine.

STONY POINT, a town of New York, in Rockland County, 36 miles north of New York City, on the West Shore Railroad. It is situated on a rocky promontory of the Hudson River,















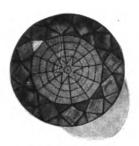






(Opp. 2750)

Garnet (January).
Diamond (April).
Ruby (July).
Opal (October).



BIRTH STONES. Amethyst (February). Emerald (May). Sardonyx (August). Topaz (November).



Bloodstone (March). Agate (June). Sapphire (September). Turquoise (December).



which was fortified by the colonists in the Revolutionary War and in May, 1779, was captured by the British under Clinton. On July 16, 1779, Washington detailed General Wayne with 1,200 men to retake Stony Point, which he did by successfully surprising the British and making a gallant bayonet charge. In 1902 a national park was established here, which includes the remains of the fort. Population, 1910, 3,651.

STOPPAGE IN TRANSIT, the term applied to the stoppage of a shipment of goods while they are on the way from the seller to the buyer, owing to the fact that the shipper has not been paid. Such stoppage is not based as a manner of right upon a contract between the parties, but is permitted in mercantile usage as a protection to the seller in a case where the buyer has become insolvent. However, stoppage in transit can take place only after the goods have left the possession of the seller and before they have been delivered to the buyer; that is, they must be actually in transit. This mercantile usage was recognized judicially in England as early as 1690.

The term milling in transit came from a movement in political matters in the Mississippi valley about 1885. It has reference to the right of a shipper of grain to stop a car load at some intermediate point to have the grain milled or ground, when it is to be reloaded and moved to the original destination without extra payment of freight. Milling in transit has been advocated as a political measure by those who transport grain at long distances, as from Montana or North Dakota to Chicago, and in transit utilize

the water power of Minneapolis for milling. STORAX (stō'răks), a balsam obtained from the storax tree, known as styrax to the ancients. This tree is native to the region adjacent to the Mediterranean and the balsam is obtained by making incisions in the bark. It is a fragrant resinous substance, has an aromatic taste, and is used to some extent in medicine. After exuding from wounds in the bark, it hardens and forms reddish-yellow tears about the size of a

STORER (stōr'ēr), Bellamy, lawyer and diplomatist, born in Cincinnati, Ohio, Aug. 28, 1847. After graduating from Harvard University in 1867, he studied at the Cincinnati Law School and two years later began a successful practice at Cincinnati. He was made United States district attorney in 1870 and served in Congress from 1891 to 1895. President McKinley appointed him minister to Belgium in 1897 and two years later made him minister to Spain to fill the vacancy occasioned at the outbreak of the war, in 1898. After serving at the Spanish capital until 1902, he was made ambassador to Austria-Hungary, but was succeeded in that office by Charles S. Francis, under an appointment of President Roosevelt, in 1906.

STORK, a genus of wading birds which belongs to the heron and bittern family, most familiar in Holland and Germany. About a dozen species have been enumerated. The common white stork of Southwestern Europe is tall and stately, has a height of about four feet when standing, and the body measures three and a half feet in length. The bill is long and straight, the eyes are surrounded by naked skin, the neck is long and arched, and the color is white with slight black markings. The storks arrive in Germany and the greater part of Europe in February and March, and in autumn pass to the warmer regions of Asia and Africa, making their migratory movements mostly by night. They build their nests principally on the roofs of houses, but in some places boxes are provided for that purpose. In Holland it is con-



WHITE STORK.

sidered fortunate for the household if a stork comes to live on the housetop, and in some countries laws have been made to protect these birds, owing to their ability to destroy reptiles and small rodents and remove offal from the streets. It is not an uncommon thing to see storks in the midst of throngs of people in some of the European cities, where they apparently move with perfect composure.

The parents show remarkable affection toward their young, while aged birds are treated with marked kindnesses. Before migrating from their summer haunts they gather in large flocks, and, having no voice, they make a peculiar clatter with their mandibles. Storks rear annually three to five young, which they feed in their nests until matured to a stage ready for flight, when they are trained by the parents to move on the wing. The food consists mostly of lizards, small mammals, insects, snakes, frogs, fishes, and offal. A species of black stork is common to Poland and northern Germany,

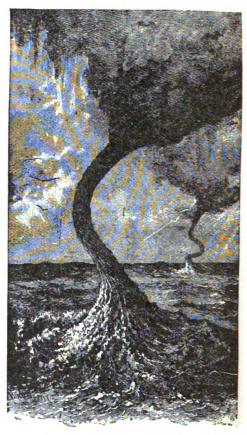
whence it moves southward in the fall. The American stork, which is common to South America, and the adjutant bird are allied to the white stork.

STORMS, the familiar violent disturbances of the atmosphere which occur in the form of high winds accompanied by rain, hail, snow, or thunder and lightning. All parts of the world are subject to storms, but the most violent occur in the tropical regions, where they frequently continue without intermission for several days. Practical advance in the science of meteorology has led to the discovery of the general laws governing storms and storm centers, and, connecting with this an efficient weather bureau service, it has become possible to derive considerable profit from forecasts of atmospheric disturbances. During storms the wind varies in velocity from that of a moderately high breeze to about 200 miles per hour. When the velocity of the movement per hour does not exceed 5 miles, it is called a gentle wind; when not exceeding 15 miles, a pleasant gale; when not exceeding 25 miles, a brisk gale; and when not exceeding 50 miles, a storm. Great storms move at a velocity of 60 miles per hour; violent hurricanes, at 100; and tornadoes, at from 80 to 200.

The extent of storms varies greatly, but the larger disturbances are seldom less than 500 miles in width. They frequently pass from the equatorial region of America to the Arctic Ocean, though the velocity of the wind decreases somewhat as they move to higher latitudes. The direction of storms is influenced notably by the prevailing winds, the condition of the surface, and the slopes; while the velocity is influenced by the union of currents originating from high temperatures. It is interesting to observe that storms do not proceed uniformly in the same direction from day to day and that they vary greatly in velocity in different sections, the most violent disturbances resulting in so-called storm centers. Observers have noted that the great storms in North America are attended by immense whirling of the wind, thus forming a species of cyclone. The storms visiting the eastern seaboard originate in the region lying between Texas and Saskatchewan, and some of the larger of these cross the Atlantic to the northwestern coast of Europe. They begin by the winds blowing toward the area of low barometer, and during the prevalence of the storm the winds are northeast, east, or southeast.

Cyclones are storms in which the velocity of the wind is much greater than usual and the air moves in whirls or eddies, but of much greater power and diameter than in whirlwinds. They are called hurricanes in the West Indies and typhoons in the China Sea and the Indian Ocean. Cyclones have their origin in marked differences of temperature, usually at the change of the monsoon after the intense heat of summer is over. They are attended by excessive rainfall and intense lightning and thunder. Tor-

nadoes and whirlwinds are more limited in area than the cyclones, but they belong to the same class of atmospheric disturbances. Their velocity and violence often exceed that of cyclones. It is thought that they originate from the rotary motion of the air occurring above the earth's surface, which results in a rapid movement upward of the warmer air near the surface. Storms of this class, but of small extent, are not infrequent in many sections of Canada and the



STORM ON THE OCEAN.

United States. Their course is generally toward the northeast and their extent ranges from a few yards to a mile in width, but in many cases their power is spent after traveling from 100 to 200 miles. It has been observed that these local storms have a tendency to rise and fall like a bouncing ball, thus touching the surface only at intervals.

Vast storms driving fine particles of snow frequent practically all the regions which have a plain or open surface, and are known as blizzards, or snowstorms. They occur as moderately high winds and in many sections vast drifts of snow are carried into ravines and railroad cuts, the latter being usually protected by snow fences, which serve to stop the snow that is

driven along the surface. Systematic study of the occurrence and direction of winds has led to the establishment of regular routes of travel across the ocean and, when advantage is taken of them and of ocean currents, the time required by vessels for sailing from one port to another is diminished materially. Storms have a modifying effect upon the character of seasons in various sections. This is due to their influence in carrying moisture from the region of water surfaces and to their effect in causing condensation of atmospheric vapors. In the United States, Canada, and most European countries, storm and weather charts are published regularly, thus indicating the probable effect upon commercial traffic and soil productions. See Cyclone; Signal Service; Weather.

STORRS (stôrz), Richard Salter, clergyman and author, born in Braintree, Mass., Aug. 21, 1821; died June 15, 1900. He was the son of Richard Salter Storrs (1787-1873), a Congregational clergyman, and in 1839 graduated from Amherst College. Subsequently he studied law, took a course of theology at Andover Seminary, and was ordained a clergyman of the Congregational Church. He secured a charge at Brookline, Mass., the same year, but in 1846 became pastor of the Church of the Pilgrims, in Brooklyn, N. Y. He lectured successfully at Princeton and in the Union Theological Seminary, was elected to the American Board of Foreign Missions in 1887, and for a number of years was an editor of the New York Independent. Besides being an eloquent and able pulpit orator, he takes high rank as a writer. Among his best known works are "The Divine Origin of Christianity Indicated by Its Historical Effects,' "Constitution of the Human Soul," "Manliness in the Scholar," "Early American Spirit and the Genesis," "Broader Range and Outlook of Modern College Training," "Forty Years of Pastoral Life," and "Oration on Lincoln."

STORY (story), Joseph, jurist and educator, born in Marblehead, Mass., Sept. 18, 1779; died Sept. 10, 1845. He graduated from Harvard University in 1798, was admitted to the Massachusetts bar in 1801, and served as a Democrat in Congress from 1809 to 1810. In 1811 he was appointed as associate justice of the United States Supreme Court, which position he retained until his death. He was professor of law at Harvard from 1829 to 1845, where his success as a teacher of jurisprudence placed him among the foremost of Americans. His writings include "Conflict of Laws," "Law of Partnership," "Law of Promissory Notes," "Equity Jurisprudence," and "Commentaries on the Constitution of the United States." The last mentioned work is still the leading authority on the interpretation of the United States Constitution. He contributed articles filling 200 pages to Lieber's Encyclopedia Americana.

STORY, William Wetmore, lawyer, poet, and sculptor, born in Salem, Mass., Feb. 12,

1819; died in Vallombrosa, Italy, Oct. 7, 1895. He was a son of Joseph Story, the jurist, and, after graduating from Harvard in 1838, was admitted to the Massachusetts bar. After practicing the law profession for five years, he turned his attention to sculpture and literature. He was commissioned to execute a statue of his father, and, to secure aid and suggestions, proceeded to Rome, where he spent considerable time in mastering the details of Italian art. His sculptures and statues include those of Josiah Quincy, Edward Everett, George Peabody, and James Russell Lowell. Among his other productions are works entitled "Little Red Riding Hood," "The Shepherd Boy," and "Cleopatra." He published two treatises on law, entitled "Treatise on the Law of Contracts" and "Treatise on the Law of Sales." His literary works include "The Poets' Portfolio," "Conversation in a Studio," and "Later Readings." He contributed to The Traveller and The Farmer's Museum.

STOSS (stòs), Veit, sculptor and engraver, born at Nuremberg, Germany, in 1440; died in 1533. Very little is known about his parentage or early life. The first definite mention of him is in 1477, when he took up his residence in Cracow. In 1499 he purchased a mansion in Nuremberg, where he resided the remainder of his life. Having lived to a ripe old age, he was totally blind the latter years of his life. His works are very numerous in the galleries of Europe, and he ranks among the leading wood engravers of Germany. Among his sculptures are "The Death of the Virgin," "Monument of King Casimir IV.," "Christ on the Mount of Olives," "The Angel's Salutation," and "The Taking of Christ."

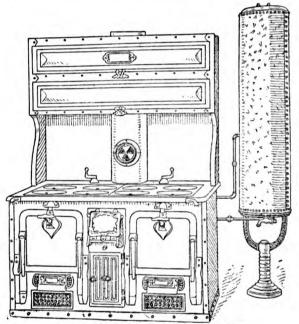
STOTHARD (stoth'erd), Thomas, painter, born in London, England, Aug. 17, 1755; died April 27, 1834. He was a student in the Royal Academy and began his career as a designer of patterns for the silk trade. Later he became an illustrator of books and a painter. Many of his designs were engraved and are in the British Museum. The books illustrated by him include "Robinson Crusoe" and "The Pilgrim's Prog-Among his paintings are "The Flitch of ress." Bacon," "The Canterbury Pilgrims," "The Woodland Dance," and "Four Periods in a Sailor's Life." The illustrations made for Shakespeare's "Seven Ages of Man" are characteristic of his works.

STOUGHTON (stō'tǔn), a town of Massachusetts, in Norfolk County, 18 miles south of Boston, on the New York, New Haven and Hartford Railroad. It is surrounded by a farming and fruit-growing country. The public utilities include electric lighting, waterworks, and a library of 8,500 volumes. It has manufactures of hardware, woolen textiles, machinery, and boots and shoes. The town was incorporated in 1726. Population, 1905, 5,959; in 1910, 6,316.

STOVE, an inclosed fireplace used for cooking and for heating rooms. In former times the

open fireplace was used for these purposes and the term stove was applied to those that were movable and to the room itself, when so heated by a fire. Stoves constructed entirely of iron are of modern invention and were probably first used in France about 1710. Shortly after they were introduced into England and Germany. Benjamin Franklin, after he visited Europe, contributed considerable to the literature on the subject of stoves. He described one of German construction as an iron box made of five plates put together and fastened by screws, leaving one side open. This side was set outside of the room, the stove itself projecting through the wall. While all trouble from smoke within the building was thus avoided, a larger per cent. of heat and the advantage of ventilation through the stove flue were lost. In 1745 Franklin invented a stove which consisted of a rectangular box of cast-iron plates. It was so constructed that the draft was downward and the heat was distributed almost uniformly from all sides.

Stoves of modern construction came into general use about 1825 and the varieties are now very numerous, including devices for heating



STEEL RANGE WITH HOT WATER TANK.

and cooking in which wood, peat, and coal are burned. Cooking stoves used at present are made largely of sheet steel, in the form of ranges, with hot water tanks attached, and those for gas are of sheet iron and steel. Heating stoves are used extensively in the smaller towns and generally in the country, but they have been displaced largely by furnace, steam, or water heating in the cities. Stoves suitable for burning gas, gasoline, kerosene, wood, and coal are used extensively for cooking. Oil and gas stoves do not heat the room, hence are preferred for summer use, while wood and coal stoves are employed extensively where service for both cooking and heating is desired.

STOWE, Harriet Elizabeth Beecher, educator and author, born in Litchfield, Conn., June 14, 1812; died in Hartford, July 1, 1896.

She was a daughter of Dr. Lyman Beecher and a sister of Henry Ward Beecher. In early child-hood she developed a fondness for reading and study, thus giving her advan-tages from which she drew inspiration for an active and influential life. Her family removed to Cincinnati, where,

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HARRIET BEECHER STOWE.

in 1836, she married Calvin Ellis Stowe (1802-1886), then a teacher in the Lane Theological

Seminary. Her life in Cincinnati brought her in contact with many of the evils of slavery and her interest in the cause of abolition was intensified by her husband being in close touch with a number of prominent abolitionists, all this tending to develop in her a lasting and profound interest in favor of emancipation of slaves in the United States. In 1849 she published her first book, entitled "Mayflower, or Sketches of the Descendants of the Pilgrims," and the following year her husband became professor in Bowdoin College, Brunswick, Me. It was there that she wrote her famous "Uncle Tom's Cabin" as a serial story for the National Era, an anti-slavery periodical published in Washington. Many of the characters and incidents of this work were taken from personal observations and from accounts of slavery given by her brother, who had been on an extended tour in the Southern States. In 1852 it was published in book form. It may be regarded as an epoch-making book. The production gives evidence of the keen intellect of its author and glows with the energy of an impassioned soul. It stirred the depths of men's hearts to

appreciate sincere love of truth and right, and laid hold upon the conscience of a nation. It was a strong factor in bringing about the freedom of the slaves.

The interest in "Uncle Tom's Cabin" was not confined to the United States, but it was translated into many European and Asiatic languages. It was dramatized in twenty forms and its remarkable and continuous sales placed it among the phenomenal books of the trade. Mrs. Stowe

visited Europe in 1853 and as a result published "Sunny Memories of Foreign Lands." In 1869 she published "True Story of Lord Byron's Life," with which she created a sensation by alleging that the great poet was to blame for the separation from his wife. This was followed by exhaustive refutations from the pen of many American and English writers, but she reaffirmed her position by answering them in her work entitled "Lady Byron Vindicated." The charm of Mrs. Stowe's writings lies in her knowledge of human nature and in her exquisite sense of humor. She was an appreciative observer and a congenial companion, and possessed remarkable power of presenting her thoughts in an earnest and yet kindly spirit. Among her writings not named above are "Dred, a Tale of the Great Dismal Swamp," "Oldtown Folks," "Oldtown Fireside Stories," "The Minister's Wooing," "Pink and White Tyranny," "Betty's Bright Idea," "Pearl of Orr's Island," "My Wife and I," "Palmetto Leaves," "A Key to Uncle Tom's Cabin," "Geography for My Children," and "American Woman's Home."

STRABO (strā'bō), ancient geographer, born in Pontus, Asia Minor, about 54 B. C.; died in 21 A.D. He was of Greek descent and secured a liberal education at Amasia, in Pontus. It appears that he entered upon extensive travels soon after completing his study, visiting portions of Europe, Asia, and Africa, and by personal observation and devoted study became qualified to prepare the most valuable geographical writings of antiquity. His geographical works appeared in seventeen volumes, all but the seventh of which are still extant. In the first two books he gives an elaborate introduction, while the next eight are devoted to Europe, the six following to Asia, and the last to Africa. He published two works entitled "Continuation of Polybius" and "Historical Memoirs," but neither of them is extant.

STRADIVARI (sträd-e-vä're), or Stradivarius, Antonio, eminent violin maker, born in Cremona, Italy, in 1644; died there, Dec. 17, 1737. He worked under Nicolo Amati until 1700, when he became an independent violin maker. Later he made guitars, mandolins, and viols, all of which he constructed of such good material and with such degree of scrutinizing care that the tone and finish have never been excelled. Many musical instruments of his make are carefully preserved and command prices ranging from \$800 to \$3,000. The most famous of these, called the Dolphin from its tone and finish, was owned by the Marquis de la Rosa.

STRAFFORD (străf'ferd), Thomas Wentworth, Earl of, statesman, born in London, England, April 13, 1593; executed May 12, 1641. He was the eldest son of Sir William Wentworth, who provided for his education at Cambridge University and later supplied the means to travel extensively in Southern Europe. In 1611 the honor of knighthood was conferred upon him and in 1614 he entered Parliament for Yorkshire, but took no prominent part in the debates until seven years later. At that time he became a leading opponent of Charles I. and the proposed war with Spain, and his ability as a speaker became recognized. He was created a baron in 1628 and made councilor and president of the north, and in 1632 became governor of Ireland. These distinguished honors gradually inclined him with more favor toward the king, but he was never his sincere friend. His administration in Ireland was generally worthy, though oppressive, but perhaps not more severe than was necessary to preserve the authority of England.

Besides improving the army in Ireland, Strafford encouraged industrial arts, suppressed piracy on the seas, and encouraged educational and commercial development. He was made Earl of Strafford in 1639, but the following year was impeached on a charge of high treason, the alleged cause being that he had expressed the opinion that his army in Ireland was sufficient to reduce the kingdom. He was accordingly convicted and ordered to be executed. When notified of his doom, he exclaimed, "Put not your trust in princes." It was the aim of the king to secure his safety, but his counselors advised him differently. Besides, Strafford had written the sovereign to ratify the bill rather than imperil his own safety. He was accordingly executed on Tower Hill.

STRAITS SETTLEMENTS, the general name of British territory in Southeastern Asia, comprising the southwestern part of the Malay peninsula and several adjacent islands. The chief divisions are the provinces of Malacca and Wellesley, on the mainland, and the islands of Singapore, Penang, and the Dindings. Besides these are a number of island dependencies, including the Christmas and Cocos islands. The area is given at 1,475 square miles. Singapore (q. v.) is the capital and most important city of these possessions. The soil is generally fertile, the climate is tropical, and the people are a mixture of Asiatics and Polynesians. Among the chief exports are sago, copra, rattan, gums, spices, canned goods, and fruits. Tin is the chief product and the tin-smelting works are counted the largest in the world. The export and import trade is important, much of which is with the United States, England, and Germany. In 1901 the exports to the United States aggregated \$19,500,000 in Mexican currency. Few railroads have been built, but the colony has several fine canals and a large mileage of improved roads. The inhabitants include 281,980 Chinese, 216,285 Malays, and 5,142 Europeans. Population, 1916, 781,424.

STRASSBURG (sträs'boorg), or Strasburg, a city in Germany, capital of Alsace-Lorraine, on the Ill River, about two miles from the Rhine. It is situated in a fertile region of southern Germany, has extensive railroad facilities, and

is the seat of an important commercial and manufacturing trade. A system of canals unites the Ill with the Rhine, Rhone, and Marne rivers, thus giving it water connections with the Mediterranean and the Atlantic. As a strategical point it has few rivals, being thoroughly fortified by substantial fortresses and favored as to natural advantages. The streets are improved by substantial pavements and sewerage, lighted by gas and electricity, and supplied with electric street railways. The manufactures include watches and clocks, leather goods, cutlery, cottons, woolen and silk fabrics, musical and scientific instruments, earthenware, tobacco products, jewelry, machinery, and ironware. The Minster Cathedral is a beautiful specimen of Gothic architecture and one of the most magnificent buildings in the world. It was founded in 1015 and has a spire 466 feet high. The cathedral is adorned with fine statues, a great rose window, and excellent specimens of paintings and frescoes.

Strassburg has a famous astronomical clock, completed by Isaac Habrecht in 1570, which ranks as the largest and most remarkable in the world. It is in the tower of the Minster Cathedral. Among the buildings of note are the palace, the Saint Thomas Church, the university, the city hall, and numerous educational, charitable, scientific, and religious institutions. The Kaiser Wilhelm University is the most celebrated of its educational institutions. It has 118 professors, 1,500 students, a fine laboratory, and a library of 850,000 volumes. The city has many beautiful gardens and parks, numerous monuments, and many charitable and benevolent institutions. The city was known as Argentosatum to the Romans, who are supposed to have founded it as a point of defense against the Germans, but the latter soon came in possession of it. It became a free city of Germany in the 13th century, but was ceded to France in 1681 by the Treaty of Ryswick. The Germans conducted a siege of seven weeks in the Franco-German War and on Sept. 28, 1870, the French capitulated. Considerable damage was done during the bombardment, but the city has been greatly improved and more strongly fortified since its annexation to the German Empire. Population, 1905, 167,678; in 1910, 178,290.

STRASSBURG CLOCK, the celebrated clock in the cathedral, or Minster, of Strassburg, Germany. It was first built in 1352 by John, then Bishop of Lichtenberg, and was replaced by an improved structure in 1570. The present clock was built by Charles Schwilgué in the early part of the 19th century. Although a few of the original movements were restored, the present mechanical works were designed by the builder. The base is 15 feet wide and the height is 30 feet. A winding stairs on one side permits going to the different stories. Opposite the stairway is a Gothic pillar, the panels of which are decorated with figure paintings. The

base of the clock contains a globe of the heavens, which shows the rising, passing, and setting of all visible stars that appear over the meridian at Strassburg. A calendar, indicating the religious feasts and the days of the month, is immediately back of the globe. Apollo, represented by a life-sized figure, indicates the day of the month, and other astronomical events are shown by the calendar in the form of an annular band.

Figures drawn in chariots appear each day, immediately above the calendar, Apollo appearing on Sunday, Diana on Monday, Mars on Tuesday, Mercury on Wednesday, Jupiter on Thursday, Venus on Friday, and Saturn on Saturday. The time of day is indicated above these figures on the dial. Two figures, one on each side of the dial, are so constructed that one of these strikes the quarter hours and the other turns an hourglass every sixty minutes. A large planetarium is on the second story and the third story has a globe which shows the phases of the moon. Movable figures in the upper part strike the quarter hour. These figures represent four periods of life, those of infancy, youth, old age, and death, and above them is a figure of Christ. He is passed each day at noon by a procession of the Apostles. When Peter passes the Savior, a cock flaps its wings and crows three times, while Judas Iscariot, in passing, turns his face from the Master

STRATFORD (străt'fērd), a city of Ontario, capital of Perth County, 87 miles west of Toronto. It is on the Avon River and the Georgian Bay and Lake Erie and the Grand Trunk railways, the shops of the latter being located here. The chief buildings include the county courthouse, the townhall, the Windsor and Albion hotels, the public library, and several fine schools and churches. It has manufactures of boots and shoes, flour and grist, cordage, candy, biscuits, clothing, hardware, and farming machinery. It is a port of entry and carries a large trade. Population, 1911, 12,946.

ries a large trade. Population, 1911, 12,946. STRATFORD DE REDCLIFFE (străt'ferd de red'klif), Sir Stratford Canning, statesman and diplomatist, born in London, England, Nov. 4, 1786; died Aug. 14, 1880. He was a first cousin of George Canning, studied at Cambridge University, and in 1807 became secretary to his cousin, who had been appointed foreign minister. In 1808 he was made secretary at Constantinople and two years later became ambassador, in which capacity he negotiated a treaty between Turkey and Russia, thus releasing the Russian army in 1812 to oppose Napoleon in his Russian campaign. He was appointed minister to Switzerland in 1814, served as commissioner at the Vienna Congress of 1815, and from 1819 to 1823 was minister to the United States. In 1825 he was sent to Constantinople to promote the independence of Greece and six years later aided in fixing the boundaries of the new kingdom. He was am-bassador at Constantinople from 1842 to 1858,

holding that position during the Crimean War, but in the latter year returned to London. His service there was the means of beginning numerous reforms, especially with regard to the liberties enjoyed by Christian citizens of Turkey and various industrial enterprises. He was raised to the peerage in 1852 and was created a Knight of the Garter in 1869. Besides publishing a number of poems, he wrote a play entitled "Alfred the Great in Athelny" and a work called "Why I Am a Christian."

STRATFORD-ON-AVON (ā'vŭn), a market town of England, situated in Warwickshire, eight miles southwest of Warwick, on the Avon River. It is noted as the birthplace of Shakespeare, and the house in which the famous writer was born is now preserved as the property of the government. The building is in a good state of preservation, but its external appearance has been much altered. The remains of Shakespeare were buried in the parish church and at the north wall are his monument and bust. Fully 20,000 visitors go to Stratford annually to visit the interesting places associated with the life of Shakespeare, this being the principal source of income to support the town. The visitors are shown the room in which he was born, the grammar school that he attended, and the theater erected in 1877 at a cost of \$150,000, which occupies the site of the old theater used in the time of Shakespeare. Other objects of interest include an American stained glass representing the seven ages, now in the window of the old church, the Shakespeare fountain erected in 1887 by George W. Childs, and the cottage of Anne Hathaway. The town has good hotel and railroad accommodations for visitors, and the surrounding country is fertile and quite beautiful. Population, 1917, 10,685.

STRATHCONA AND MOUNT ROYAL, Donald Alexander Smith, statesman, born at Archieston, Scotland, in 1820. He emigrated



LORD STRATHCONA.

to Canada and in 1838 entered the employ of the Hudson Bay Company. For some time he was stationed on the coast of Labrador and in the northwest, and was the last resident governor of that corporation as a governing body. During the Riel rebellion he was special commissioner and in 1870

elected to the first session of the legislature in Manitoba. The following year he became a member of the Canadian House of Commons, where he was a factor in directing the attention of that body to the needs and possibilities of the Red River settlements. With the exception of the period of 1880 to 1887, he remained a member of the Dominion Parliament until 1896, when he became high commissioner for Canada to London. He was a promoter and director of numerous banking and railway corporations, chancellor of the University of Aberdeen, and did much to promote the development of the western part of Canada. Queen Victoria knighted him in 1886 and made him a peer in 1897, when he became Baron Strathcona and Mount Royal. He died Jan. 21, 1914.

STRATHCONA. See Edmonton.

STRATIFICATION (străt-ĭ-fĭ-kā'shun), in geology, the arrangement of certain rocks into parallel layers, or the state of being deposited in the form of strata. Originally the materials found in stratified rocks were loose substances, as clay or sand, and were deposited by the action of moving water. The common forms of stratification are found in shale, limestone, and sandstone, and these were formed in the beds of rivers and streams and on the shores of seas. In many instances the strata lie horizontally, but frequently they incline, when they are said to dip. They are either conformable or uncomformable, depending upon whether their planes are parallel to each other. A group of one or more layers of the same mineral is a stratum.

STRAUS (strous), Oscar Solomon, public man, born at Atterberg, Germany, Dec. 23, 1850. He came with his parents to the United States in 1854 and resided in Georgia until after the Civil War. In 1871 he graduated from Columbia College, was admitted to the bar, and subsequently practiced law and followed a mercantile life. In 1887 he was appointed minister to Turkey by President Cleveland and in the campaign of 1896 became affiliated with the Republican party. President Roosevelt made him a member of the permanent court of arbitration at The Hague, in 1892, as successor to President Harrison. He succeeded Victor H. Metcalf as Secretary of the Department of Commerce and Labor in 1897. His books include "The Origin of the Republican Form of Government in the United States," "The Development of Religious Liberty in the United States," and "Reform in the Consular Service."

STRAUSS (strous), David Frederich, eminent author, born in Ludwigsburg, Germany, Jan. 27, 1808; died Feb. 8, 1874. After studying in his native town, he attended the theological seminaries of Blaubouren and Tübingen and in 1830 became a clergyman. Subsequently he spent six months in taking lectures under Hegel and Schleiermacher at the University of Berlin, and in 1832 became professor of philosophy at Tübingen. In 1835 he published his famous "Life of Jesus," in which he advanced the theory that the gospel history is a collection of myths gradually originated in Christian communities and later developed into an accepted historical truth. This work caused intense excitement in Germany and adjacent countries and

was subjected to many criticisms and investigations. Strauss was dismissed from his position in Tübingen and soon published numerous replies to his critics, the two most important being "Two Conciliatory Papers" and his "Publication of the Times." In 1839 he was made professor of dogmatic theology in Zurich and, being prevented from taking his place by reason of public opposition, he accepted a small pension. He devoted the remainder of his life to literary work, publishing many widely read addresses and treatises. His "Six Popular Addresses" were delivered in connection with the Revolution of 1848 and afterward were published in book form. Among the most noted of his later writings are "Review of Christian Doctrine," "The Old and the New Faith," "Christ of Faith," "The Romantics on the Throne of the Caesars," "Life of Schubert," "Lectures on Voltaire," "Life of Ulrich von Hutten," and "New Life of Jesus." His complete works were published in 1876.

STRAUSS, Johann, musical composer, born in Vienna, Austria, March 14, 1804; died there Sept. 25, 1849. He began to play the violin when a mere child and in 1819 secured an engagement as violinist at the Sperl Theater in Leopoldstadt. In 1826 he introduced his famous band to the public of Vienna and shortly after made an extended tour throughout Northern Europe, meeting with brilliant success in the principal cities. He visited Great Britain for an extended tour in 1849, but soon returned to Vienna and died of scarlet fever.

STRAUSS, Johann, composer, son of the former, born in Vienna, Austria, Oct. 25, 1825; died there June 3, 1899. He succeeded his father as manager of the famous Strauss orchestra, with which he traveled and gained fame in most of the countries of Europe. In 1872 he came to America to conduct an orchestra of 1,000 performers at the Boston Peace Jubilee, and while in the United States played with remarkable success in many of the principal cities. The fiftieth anniversary of his début in Vienna was celebrated with great pomp in 1894. He was for many years music director to the emperor at Vienna. Both he and his father take very high rank among the eminent German masters of music. Besides composing over 400 waltzes, he is the author of numerous operettas. The most popular of the latter include "Carnival in Rome," "Happy War," "A Night in Venedig," "Prince Methusalem," "Gypsy Baron," "Knight Pasman," "The Bat," "Cagliostro," "Jabuka," and the noted operetta, "Indigo."

STRAUSS, Richard, composer, born in Munich, Germany, in 1864. He began the study of music at a very early age, and when quite young had mastered the technics of the piano and violin. In 1885 he was made musical director at Meiningen and the following year received an important position at Munich, where

he remained until 1889, when he was made a kapellmeister at Weimar. In 1894 he completed his musical drama entitled "Guntram," which caused notable interest. He was made kapellmeister at Berlin in 1898 and for many years took a leading part in directing the trend of music in Europe. His chief symphonic works include "Don Juan," "A Hero's Life," "Till Eulenspiegel," "Death of Apotheosis," "Don Quixote," and "Thus Spake Zarathustra." His tone poem, Sinfonia domestica, is greatly admired and his opera Feuersnot has been rendered in the principal cities of Europe.

STRAW, the term generally applied to the dry or ripened stalks of certain plants, such as wheat, barley, oats, rye, and buckwheat. It is used extensively as a food and bedding for animals after the grain has been threshed out, especially that of oats, and quite frequently for packing materials in making shipments. On the large farms in the western states it is quite impossible to consume all the straw in feeding and bedding animals, but the stacks in such cases are spread out considerably to receive the water from rains, thus converting them rapidly into manure, which is afterward used as fertilizer for the land. Straw is employed in the arts in making paper, hats, bonnets, baskets, rugs, and bags. The finer products, such as hats and bonnets, are made from straw cut before it is quite ripe. Wheat is the grain sown usually for that purpose, the seed being strewn thickly so as to produce fine-grained straws. It is cut by hand when ripe and carefully dried in the sun. After being bleached in the sun and dew, it is steamed and separated into different sizes, and is then woven by women and girls into tapelike braids. These are carefully flattened by pressure and sewn together to make hats and bonnets, colors being often alternated to give the product an artistic appearance.

Within recent years much progress has been made in the manufacture of goods from straw and the price has been materially lessened. owing largely to the invention of machinery of service in preparing the materials and sewing them together. Extensive manufactories for making straw-plait work are operated in the United States, particularly in Massachusetts. The principal enterprises of this kind in foreign countries are in northern Italy, Switzerland, Germany, France, and China. Bedfordshire has been the center of the British straw-plait industry for several centuries, owing to the favorable climate for producing straw of considerable strength and a fine, bright color. Chip hats closely resemble those manufactured of straw, but they are made by cutting the Lombardy poplar into splints and treating them quite like the straws of grain. To secure good results, it is necessary to bury the logs of this tree in dry ground for three years, thus removing the sap, and, after becoming dried, it assumes a reddish

color. Hats are made in Panama and several South American countries from palm tree leaves.

STRAWBERRY, a genus of plants extensively cultivated for their luscious fruit. They were so named from the practice of laying straw between the rows to keep the ground moist and free from weeds. The utility of putting straw between the rows consists in keeping the berries clean, and in the colder climates it furnishes a suitable protection against freezing in the winter. Strawberries are native to America and Europe, where they are distributed quite extensively as wild plants, and from these the principal cultivated species have been developed by propagation. The plants bear trifoliate leaves, usually white flowers on scapes, and slender runners by which they are propagated. They are mostly perennial and are propagated



VIRGINIAN STRAWBERRY.

by runners, by seeds, and by divisions of the plant. The fruit is highly valued for dessert and as such is eaten with sugar and cream. It is used extensively in making jam, for pies, and in preparing a flavor syrup.

The trade in strawberries has developed into a very extensive industry in Canada and the United States, the southern-grown being shipped to the northern regions, while in the latter the fruit ripens at a later time, thus making the strawberry season one of considerable length. A nice illustration is found in New York, which is first supplied with the strawberries grown in the southern states, next by those grown in New Jersey, and finally by securing quantities from New England. Among the species extensively cultivated are the wood strawberry, the alpine strawberry, the Virginian strawberry, and the hautbois strawberry. Many species have been developed from the wild and from seed of the cultivated varieties. Few fruits are held as highly in favor as well-grown strawberries.

STREATOR (stre'ter), a city of Illinois, in

La Salle County, on the Vermilion River. 96 miles southwest of Chicago. It is on the Wabash, the Chicago and Alton, the Chicago, Burlington and Quincy, the Atchison, Topeka and Santa Fé, and the New York Central railway lines. The place is surrounded by an agricultural and coal-mining region. Among the principal buildings are the high school, the opera house, the Carnegie library, and many schools and churches. The manufactures include flour. glass, earthenware, pop, tile, brick, and machinery. It has waterworks, sewerage, several parks, and a growing trade. The streets are lighted by electricity. They are substantially paved and traversed by street railways. It was settled in 1860 and incorporated as a city in 1882. Population, 1900, 14,079; in 1910, 14,253.

STREET, George Edmund, architect, born at Woodford, England, June 20, 1824; died Dec. 18, 1881. He studied architecture under Gilbert Scott and was appointed architect for the diocese of Oxford in 1850. His favorite style was the Gothic and he became a leader in reviving interest in this class of architecture. Among the principal buildings erected by him are the Church of Saint Margaret, Liverpool; the Jesus College Chapel, Cambridge; the Synod House, Dublin; and the Crimean Memorial Church, Constantinople. He won many prizes for making designs and received several decorations. His work entitled "Some Account of Gothic Architecture in Spain" contains an interesting review of the churches and cathedrals of the Iberian peninsula.

STREET RAILWAY, the general name of a railway operated entirely or in part upon the streets of towns or cities, designed principally to furnish intercommunication for passengers. This form of transportation was developed from the tramway, which is constructed of wooden stringers covered with strips of iron and the cars are drawn by horse or steam power. The first street railway of North America was built in New York City, in 1831, and extended from the Bowery to Harlem. It was known as the New York and Harlem Railroad and was operated as a horse-car line for many years. Though the cars were small and the speed was comparatively slow, it was pronounced a success and similar lines were soon constructed in Boston, Philadelphia, Berlin, Liverpool, and London.

Street railways operated by cable were first introduced at San Francisco in 1873, where they proved eminently satisfactory, owing to many of the streets having heavy grades. The motive power in railways of this kind is furnished by a stationary steam engine located at a central point and an endless wire cable, guided by suitable pulleys, is moved or driven at a rapid speed. This cable is in an underground conduit between the rails and a grip projects downward from the bottom of the car through a slot at the top. At the lower end of the grip are jaws

that can be operated from the platform of the car. When the jaws grasp the cable, the car moves forward upon the track and it is stopped by unloosing the jaws. Many of the larger cities installed systems of cable cars, but they are now used only where the streets have steep grades, as in Seattle and San Francisco, and to make ascent of mountains, as is the case at Mount Washington.

Electric railroads were first constructed in Berlin, Germany, in 1879. They are the most popular and serviceable of all the systems and have largely displaced horse-car lines and cable railways. They do not only traverse the streets of the principal cities, but connecting lines are maintained and operated successfully in interurban and rural districts. In 1909 there were 20,658 miles of electric railways in operation in the United States. Although they were confined to no particular part of the country, Illinois, Massachusetts, and New York had the largest mileage, the amount in these states being 2,390, 2,585, and 4,520 miles, respectively. In the same year Canada had 2,990 and Cuba had 375 miles.

STRENGTH OF MATERIALS, the resistance which materials offer to forces that tend to change their form. This property is frequently spoken of as the elasticity and resistance of materials and, in sciences, the strength of material is sometimes designated the mechanics of materials. The materials used in construction possess more or less elastic properties and spring back to their original form when the forces are removed, provided the applied forces are not so great as to cause breakage. The internal resistance that balances a structure is called a stress, and such temporary changes as compression, elongation, and twisting are designated strains. It is an established rule in engineering that the strain on materials should not exceed the elastic limit, which is a point beyond which the change of form increases to an extent greater than the force applied, and unless the force is lightened or relieved rupture results. When stresses tend to cut across a body they are said to be shearing, when they tend to pull it apart they are known as tensile, and when they operate to crush it they are designated compressive. stresses tend to twist a shaft and flexural stresses operate to bend, but both classes may be resolved into the three simple classes.

Changes in architecture and engineering constructions have directed attention to the study of the strength of materials. It is important to the designer of a machine or structure of any kind to know the degree of force that may be applied safely, whether the strain will be sufficiently moderate that the material will recover from it, and to what extent force may be exercised without endangering material to rupture or breakage. Besides determining what class and amount of material is nec-

essary to carry the loads, it is an item of importance to determine what is the least quantity and most serviceable kind of material that may be put into the structure. Architects and designers cannot determine these essentials by experiments as a structure is under way, but it is necessary to know what loads and forces are to be carried as well as to understand the size and kinds of materials to be used before the work of construction has commenced.

Many machines have been patented for testing materials to determine their degree of resistance. These machines differ greatly in form and method of applying force, ranging from the most delicate used in testing the finer material utilized in instruments to the heavier grades employed in measuring the strength of large and bulky objects. Bending, stretching, crushing, tension, and shearing are the common tests. Testing by tension to determine the elastic limit, maximum strength, ultimate elongation, and contraction of area is used most extensively. Before testing a given specimen, marks are made at regular intervals and measurements are taken between them, both before and after the test, and the data for computing the changes, if any, are carefully preserved. In form testing, the apparatus differs widely, but it may be generally classified under the two forms of screw machines and hydraulic machines, so called from the methods of applying the power, which in the former is by screw and wheel and in the latter by pressure transmitted through oil by means of a pump. The testing machine designed by A. H. Emery for the United States government and used at the Watertown arsenal is considered the most precise in the world. It has a capacity of 1,000,000 pounds, is extremely sensitive, and yet has the power to break a bar thirty feet long.

In studying the theory of resistance of materials we have to do with beams, shafts, and columns, all of which are dealt with in construction work. The particular forms as well as the quantity of material used depend of course upon the force to be applied and the manner in which the force acts. In buildings the stresses are steady, hence the materials offer greater resistance to forces, while in bridges and machinery the stresses vary and the structures are subject to shocks. It is estimated that the ratio of ultimate strength in timber withstanding steady strains is as 8 against 10 for varying strains and 15 for shocks. In steel the ratio for steady strains is as 5 to 7 for varying strains and 15 for shocks, while in brick and stone it is as 15 in steady strains to 25 in varying strains and 30 for shocks.

The greatest resistance to tensile strains is offered by wrought iron and steel, and wood deflects to a greater degree under a given weight than iron or steel, owing to its having a greater elastic range of action. Strength in wood depends largely upon its weight, the

heavier kind being generally the stronger. Cast iron is employed extensively in the construction of bridges and foundations, owing to its ability to resist a great degree of compression. To minimize the consumption of material as well as decrease weight and increase stiffness, much material in hollow forms is employed. The utility of this is illustrated by the hollow construction of the bones of animals and many grasses. Engineers have developed formulas for calculating strength against stresses and have classed quite correctly the strains of materials, such as wood, stone, and metals.

STRIKE, an organized effort made by workingmen to obtain concessions from their employers concerning wages and other matters. It consists of a refusal to work unless the demands are granted. In a thoroughly organized strike the capital of the employer lies idle, usually at a considerable loss. This condition continues until a compromise is effected or other workingmen are secured. A lockout is a retaliatory measure sometimes resorted to by the employer, and is designed to induce the workmen to return to their employment, or as a notice to indicate that workmen are wanted who have not been implicated in the strike.

In the period extending from 1881 to 1900 there were 22,793 strikes in the United States, of which 14,457 were ordered by organizations and 8,326 tool: place by general agreement of the laborers. Fifty-three per cent, of those ordered succeeded, while 14 per cent, were partly successful, and the remaining 33 per cent. failed. On the other hand, of those not ordered, 36 per cent. succeeded, 9 per cent. partly succeeded, and 55 per cent. failed. The experience of the past twenty years has shown uniformly that the success of a strike depends almost entirely upon close organization of the laborers directly interested. To counteract the effect of concerted action by laborers, capital has become closely organized in all departments of the productive industries. This has had the effect of greatly prolonging strikes in which large interests are involved, such as the great anthracite coal strike of 1902, which continued about five months and cost the country \$142,500,000 by losses in business. Those having charge of organization work, both for the labor unions and operators, were confronted by a prospective strike of the miners in 1905, but the questions involved were left over to be settled in 1906. General strikes like those of Italy in 1914 are unknown in Canada and the United States.

Strikes were illegal in Great Britain until 1824 and prior to that time the participants were punished for conspiracy. However, since then many strikes have occurred each year. In 1912 Great Britain and Ireland had 485 industrial disputes, most of which involved the shipyards, textile factories, and metal workers. In the same year Germany had 3,245 strikes. They have been practically unknown in Australasia

since 1894, since which time the law has required arbitration in all industrial disputes.

The following is a table giving the number of strikes and lockouts in the United States in the period of ten years, from 1891 until 1900 inclusive:

	STRIKES.		LOCKOUTS.	
	NUMBER.	LABORERS IDLE.	NUMBER.	LABORERS IDLE.
1891	1.717	298,939	69	31.014
1892	1,298	206,671	61	32,014
1893	1,305	265,914	70	21.842
1894	1,349	660,425	55	29,619
1895	1,215	392,403	40	14,785
1896	1,026 .	421,170	40	7,668
1897	1.078	408.391	32	7,763
1898	1,056	249,002	42	14,217
1899	1,797	417.072	41	14,817
1900	1,779	505,066	60	62.653

STROBEL (stro'b'l), Edward Henry, public man, born at Charleston, S. C., Dec. 7, 1855; died Jan. 15, 1908. He was educated in the public schools of his native State and at Harvard University, and in 1885 became secretary of the United States legation at Madrid. In 1888 he was made special diplomatic agent of the United States to Morocco, served for some time as chargé d'affaires at Madrid, and returned to the United States in 1893 to become third Assistant Secretary of State. President Cleveland made him United States minister to Ecuador in 1894 and the following year transferred him to Chile, where he served efficiently until 1897. He was an arbitrator in a dispute between Chile and France in 1897, became Bemis professor of international law in the Harvard Law School, and in 1899 was counsel for Chile before the claims commission of Chile and the United States. The government of Siam selected him as general adviser in 1903. Besides contributing to periodical literature, he published "The Spanish Revolution."

STROBOSCOPE (ströb'ō-skōp), an instrument for viewing a moving object by intermittent sight. The principle is explained by a cardboard cylinder perforated near the circumference with a series of openings, and the body is viewed through these perforations while the disc rotates uniformly. If the apparatus is caused to revolve, the series of views within the cylinder may be viewed with much the same effect as that produced by moving pictures. The kinetoscope and the vibroscope were evolved from the stroboscope, and in modified form it has given rise to the invention of numerous toys for children. See Kinetoscope.

STROMBUS (strom'bus), the name of the shells of various mollusks, all of which have a more or less conic spire. These shells are found on a number of species of gastropod mollusks. The largest, known as the fountain shell, weighs from four to five pounds. It is used in making cameos and certain porcelain work.

STRONTIUM (stron'shi-um), a metallic

element belonging to the alkaline earths. It has a pale yellow color, decomposes in water, and burns with a crimson flame. In nature it is found in various combinations, but is closely associated with barium and calcium. It occurs n the ashes of certain plants and in sea and minral waters. The chief use is in making fireworks, since it burns with a bright red flame.

STRUVE

STRUVE (stroo've), Friedrich Georg Wilaelm von, astronomer, born at Altona. Germany, April 15, 1793; died Nov. 23, 1864. He studied in the University of Dorpat, in Russia, and in 1839 was made the director of the observatory at Poltava, near Saint Petersburg. While serving in this capacity he made many researches concerning double stars and conducted a number of geodetic operations. His works on astronomical subjects are numerous, especially those that relate to double stars and the nature

of the Milky Wav.

STRYCHNINE (strik'nin), an extremely poisonous compound, which is derived from several species of the strychnos nux vomica trees or shrubs. These plants are native to They are of the order tropical regions. Loganiacae, having opposite leaves and dense, aggregated clusters of white, bell-shaped flowers. They occur in the tropical parts of America and Asia and yield, besides strychnine, brucine and other powerful drugs. Strychnine is a white, crystalline compound and in small doses is a stimulant, but when administered in larger quantities is a powerful poison and causes tetanic spasms. It has been in use since 1818, when it was discovered in Saint Ignatius' beans. See Poison.

STUART (stū'ert), or Stewart, a royal family of Scotland and England, so named from the office of steward of Scotland. It appears that the house was founded at the time of David I. of Scotland, who made Walter, the son of a Norman baron, the steward of his household, and afterward the name of Steward became attached to his family. It was written in this form until Mary, Queen of Scots, went to France, when the form of Stuart was adopted by her and afterward retained by her descendants. Walter, the sixth steward of Scotland, married Marjory, the daughter of King Robert I., in 1315, and by this union the crown of Scotland became vested in his family in case the royal line would otherwise become extinct. Robert, son of Walter, became the seventh steward and, as David II. died without issue, he succeeded to the throne of Scotland in 1371 as Robert II. Fourteen Stuarts occupied the Scottish throne between 1371 and 1714, and six of that house became sovereigns of England. Queen Anne was the last Stuart to occupy the throne of England and was succeeded by the Hanover dynasty, of which the present royal family of England is a representative. The connection between the Stuart and Hanover families is through Sophia, electress of Hanover, Germany, who was the granddaughter of James VI.

STUART, Charles Edward. See Charles Edward.

STUART, Gilbert Charles, portrait painter, born in Narragansett, R. I., Dec. 3, 1755; died in Boston, Mass., July 27, 1828. He became interested in drawing sketches when a boy at school and subsequently studied painting at Edinburgh, Scotland. His benefactor, named Cosmo Alexander, died while Stuart was in Scotland and he was compelled to work his way home in a ship. He went to England in 1775, where he became a pupil of Benjamin West, and in 1785 set up a studio of his own. By perseverance and natural talent he attained a high rank among English painters and in 1792 returned to America. His work was mostly at Philadelphia until 1804, when he established a studio in Washington, and two years later removed to Boston. Three portraits of Washington are among his most celebrated productions and these have been engraved fully 250 times. Other well-known portrait paintings include those of John Adams, Jefferson, and

STUART, James Edward, public man, born in England in 1688; died in 1766. He was a son of James II. of England and his second wife, Mary Beatrice, and was involved in the exclusion of his father from the throne. The Jacobites undertook to place him on the throne by force of arms in 1715, but the rising was soon put down and Prince James, as he was generally called, escaped to France. Later he removed to Rome, where he resided much of the time, and in 1819 married a granddaughter of John Sobieski, King of Poland. Charles Edward, the Young Pretender, was a son of Prince James.

STUART, James Ewell Brown, soldier, born in Patrick County, Virginia, Feb. 6, 1833; died in Richmond, Va., June 12, 1864. After graduating from the United States Military Academy, in 1854, he served in the cavalry stationed in Texas and Kansas, and at the beginning of the Civil War resigned his command to enter the Confederate cavalry in Virginia. Among the principal battles in which he took an efficient part are those of Bull Run, Antietam, Fredericksburg, and Gettysburg. Subsequently he was made major general and had command of the cavalry under Lee, and in that capacity rendered gallant service in the battles of the Wilderness. He was mortally wounded at Yellow Tavern, where he attempted to check Sheridan's advance, and died soon after. A fine equestrian monument has been erected to his honor on Monument Avenue in Richmond, Va., inscribed with the words of General Lee, "To his comrades in arms he has left the proud recollection of his deeds and the inspiring influence of his example.'

STUART, Moses, clergyman and classical

scholar, born in Wilton, Conn., March 26, 1780; died Jan. 4, 1852. He graduated from Yale and later studied law, but soon abandoned that profession for theology. In 1806 he was made pastor of a Congregational church at New Haven and in 1810 became professor of sacred literature at Andover, which chair he held with marked success for 38 years. His first publication was a Hebrew grammar, the type for which he was compelled to set himself, owing to the lack of competent compositors. Among his writings are "Grammar of the New Testament Dialect," "Conscience and the Constitution," "Hints on the Interpretation of Prophecy," "Commentary on the Epistle to the Romans," and "Elements of Interpretation."

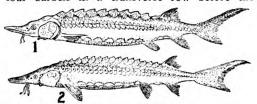
STUART, Ruth McEnery, author, born in Avoyelles Parish, Louisiana, May 21, 1849. She received a limited education, owing to the unfavorable influence of the Civil War, and in 1879 she married Alfred O. Stuart, a planter of Arkansas. In 1888 she began to contribute to a number of magazines, including the Century and Harper's Magazine. Her writings show deep thought on a wide range of subjects. They include "The Story of Babette," "Holly and Pizen," "The Woman's Exchange," "George Washington Jones," and "The Second Wooing of Salina Sue." She died May 4, 1917.

of Salina Sue." She died May 4, 1917. STUBBS, William, bishop and historian, born in Knaresborough, England, June 21, 1825; died April 22, 1901. After attending the Ripon grammar school, he entered Oxford University, graduating from the latter with high honors in 1848. He was shortly after elected a fellow at Trinity College and two years later became a clergyman at Navestock. In 1866 he was selected as professor of modern history at Oxford, became bishop of Chester in 1884, and five years later was transferred to the see of Oxford. An exhaustive and industrious student, he attained to a wide influence as a lecturer and historical writer. Among his writings are "Lectures on the Study of Mediaeval and Modern History," "Select Charters and Other Illustrations of English Constitutional History," and "Early Plantagenets." He edited a large number of important works, including Mosheim's "Institute of Ecclesiastical History," Roger de Hovedon's "Chronicles," "Historical Works of Gervase of Canterbury," "Chronicles of the Reigns of Edward I. and Edward II.," and "Memorials of Saint Dunstan."

STUCCO (stŭk'kô), a kind of plaster prepared of a mixture of a ground chalk, or marble, with pure lime as a cement, in such proportions and so worked as to procure a durable and uniform surface susceptible of polish. It is used for covering walls and for making internal decorations, and a mixture of coarser material with cement is employed for external work. Sometimes pulverized alabaster or gypsum is used instead of marble, mixed with rich lime, carefully slaked and sifted, and then

troweled on a rough coat until the surface is perfectly smooth. Other varieties are made of plaster of Paris, mixed with a saturated solution of alum or sulphate of potash, then dried in air and baked at a dull red heat. This preparation is pulverized and sifted and is then slaked with a solution of alum. Several kinds of stucco were used by the Greeks and Romans for decorating public buildings, both internally and externally.

STURGEON (stûr'jŭn), a genus of ganoid fishes, having five rows of bony shields and four barbels in a transverse row before the



1, Common Sturgeon; 2, White Sturgeon.

small, tubeless mouth. The snout is long and pointed, the body is elongated, and the eyes and nostrils are on the sides of the head. The gill covers are large, the fins are well developed, and the snout is covered with bony plates. In the spring they ascend the rivers to spawn and return to the sea in the autumn. The species which are common to the fresh-water lakes do not descend to the sea to spawn. Many species have been described. They vary in size and somewhat in general characteristics, but the flesh of nearly all is edible, both in the fresh and salted forms. A kind of pressed and salted food called *caviare* is made of the roe, and a fine grade of isinglass is obtained from the air bladder.

Sturgeons are mostly sea fish, but are found in large numbers in the bays and larger rivers. Important sturgeon fisheries occur both off the Atlantic and Pacific coasts of North America, and a fresh-water species is common to the Great Lakes, where it is caught in large quantities. The common sturgeon of America and Europe is from six to twelve feet long. A familiar species of the Gulf of Mexico, the shovelnose, is peculiar for its prolonged snout. The most important sturgeon fisheries of Europe are in the Caspian and Black seas, where the white sturgeon is found in abundance. It attains a length of 20 to 25 feet and a weight of 3,000 pounds. It yields most of the isinglass and caviare of the market. The sterlet is found in the Volga and Danube and is seldom more than three feet in length, but is noted for its delicate flesh. Lake Baikal, in Siberia, has important sturgeon fisheries.

STURGIS (stûr'jĭs), Russell, architect and author, born in Baltimore, Md., Oct. 16, 1836. He first studied architecture in New York City and subsequently in Europe, and from 1865 until 1880 practiced his profession. Among the

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buildings designed by him are Lawrence Hall of Yale University, the Homeopathic Medical College, and the Flower Hospital, in New York City. He was made professor of architecture and the art of designs in the College of the City of New York in 1878, but on account of ill health resigned after two years and traveled extensively. In 1885 he was editor of decorative art and mediaeval archaeology of the Century Dictionary, and subsequently edited the department of fine arts in Webster's International Dictionary. Besides contributing to periodical literature he edited the Dictionary of Architecture and Building. Among his publications are "Annotated Bibliography of Fine Arts," "Manual of the Jarves Collection of Early Italian Pictures," "European Architecture," and "How to Judge Architecture." He died Feb. 11, 1909.

STURM (stoorm), Johannes von, educator, born at Schleiden, Germany, Oct. 1, 1507; died March 3, 1589. He studied in Leyden and Louvain and in 1537 founded the Gymnasium of Strassburg, of which he was principal until 1580. This institution acquired a wide reputation under his administration and was ultimately converted into a university. His system of education exerted great influence throughout Germany, owing to the fact that he was liberal in religious opinions and promoted the Lutheran faith, which was generally adopted in Prussia at that time. His system of organizing educational work was made the basis of the institutions at Eton and Rugby, England, and it may be justly considered the origin of the modern graded school system.

STUTTGART (stut'gart), a city in Germany, capital of the kingdom of Württemberg, 115 miles northwest of Munich. It is beautifully situated on the Neckar River. The surrounding hills are covered with orchards, gardens, and vineyards. The streets of the newer part are broad and the buildings are handsome, but the older section has many structures which date from an early period. It has gas and electric lighting, electric urban and suburban street railways, systems of sewerage and waterworks, and beautiful gardens and parks. Königsstrasse, a beautiful and spacious thoroughfare, extends diagonally from southwest to northeast through the city. Among the manufactures are cotton and woolen fabrics, jewelry, chemicals, machinery, musical instruments, furniture, and confectionery. It has an extensive domestic and foreign trade, the latter being largely with the United States and European ports.

Stuttgart is well built of stone and brick. Near the center of the city is the royal palace, which is surrounded by a royal park, whose walks are free to the public. The cathedral dates from the 15th century. Other buildings of note include the government mint, the royal theater, the museum of arts, the palace of justice, the polytechnic school, the conservatory of music, the city hall, and the union railroad

station. The royal library has 550,000 volumes, with which are included 9,000 Bibles in 80 languages and 2,500 specimens of early printing. The city has a remarkably large book trade and publications issued here are sent to all parts of the world. Among its notable monuments are those of King William and Schiller, the latter by Thorwaldsen. The first mention of Stuttgart occurs in 1229. It was made the residence of the counts of Württemberg in 1320 and has been the royal residence almost without intermission. The importance of the city as a commercial city dates from the Franco-German War. Population, 1905, 249,286; in 1910, 285,589.

STUYVESANT (sti've-sant), Peter, director-general of the New Netherlands, born in Holland in 1602; died in New York City in

1682. After engaging in the military service of Holland in the West Indies, he was made governor Curaçoa, and while leading an attack on Saint Martin he lost a leg. The Dutch West India Company made him directorgeneral of the region included in New York, which then called the New Netherlands, where



PETER STUYVESANT.

he arrived in 1647. His policy toward the Indians was conciliatory. He established a court of justice, organized a general assembly of eighteen delegates, and from the latter selected an advisory council to assist in the government. In 1650 he joined the English commissioners at Hartford to assist in establishing the boundary between the Dutch and English possessions, and five years later annexed the Swedish settlement on the Delaware. Charles II. of England, in 1664, granted the Duke of York, afterward James II., the territory lying between the Connecticut River and the Delaware and in the same year four English warships made a forcible demand for the surrender of New Amsterdam. Resistance being fruitless, the municipal authorities yielded and on Sept. 9, 1664, concluded a treaty at the farmhouse of Stuyvesant. This farm was known as the Bouwerij, from which the Bowery in New York was named. The name of New Amsterdam was changed to New York in honor of the Duke of York. Stuyvesant lived on his farm eighteen years after his surrender and his remains were buried in New York City, at the place where Saint Mark's Church now stands, and an inscription is in the eastern wall of the church. He is described humorously by Washington Irving in his "Knickerbocker's History of New York."

STYLITES (sti'lits), or Pillar Saints, a

class of Christian saints of the early church, who occupied lofty pillars as an evidence of penance. This practice was indulged in to realize the two fundamental ideas of Christianity, separation from the things common to this world and aspiration after those of heaven. The pillars were high columns with a platform above, so limited that the occupants were obliged to stand continually in the open sky, and were protected only at the sides by a railing. Simeon the Syrian (390-459 A. D.) was the first Stylite, and commenced the practice at Antioch in 420, where he spent thirty years on a pillar having a top four feet square. The pillar was only 10 feet high when he began this practice, but it was afterward increased to 36 and later to 72 feet. His life was one of great austerity, but it is evident that he descended at times, since it is mentioned that he wrote epistles and cured the sick by his touch. After his death the Stylites became numerous and the practice continued down to the 12th century, when it was forbidden.

STYPTIC (stĭp'tĭk), a remedy employed in surgery to check the flow of blood, as in treating a wound. Formerly alum and tannin were used extensively as styptics, but they have been displaced by other agencies, since they are inclined to cause unclean clots or produce secondary hemorrhage. Capillary bleeding is arrested by cold or by cautery. The vegetable styptics used at present include turpentine, oak bark decoction, and gallnuts in the form of powder or an infusion. Among the mineral styptics are the nitrate of silver and the sul-

phates of zinc and copper.

STYX (stiks), in Greek mythology, a river of the lower regions, which flowed around Hades seven times. Across this stream the shades of the departed were conveyed by Charon, an unshaven boatman. It was so named from Styx, the daughter of Oceanus, who dwelt in a grotto at the entrance of Hades and confirmed the solemn oath of the gods. The sea goddess Thetis dipped her son Achilles in the River Styx and thereby rendered him invulnerable, except in the right heel, by which she

SUAKIM (swä'kem), or Suakin, a town and seaport of Egypt, on an island in the Red Sea, connected with the mainland by a railroad bridge. It is about 630 miles northwest of the Strait of Bab-el-Mandeb and is a favorite place for Mohammedans to embark in traveling to Mecca. Formerly it was of considerable importance for its commerce, but its trade has declined considerably with the construction of railroads and the improvement of the Nile. It has manufactures of cutlery, clothing, jewelry, and small arms. The trade is chiefly in gums, ivory, and tobacco. The Turks founded Suakim. It became a British possession in 1882 and is the residence of a number of officials. Population, 1916, 12,500.

SUBLIMATION (sub-li-mā'shun), a process of distillation in which the vapors condense in a solid form. In this process solid substances are converted into vapor through the agency of heat and on cooling again assume a solid form, when the resulting substance is called a sublimate. It takes place naturally in the fissures and craters of volcanoes and the products of a sulphurous character are deposited upon the walls. The number of mineral substances that vaporize by heat and become solid again on cooling are numerous, and the number of such increases with the degree of heat that is applied. Camphor, benzoic acid, and other vegetable substances possess the same property. Sublimation is employed in the arts and manufactures as a means of separating volatile from fixed bodies, usually for obtaining the former in a purer state. Some sublimates assume a solid and compact form, such as camphor and the sublimates of mercury, while others form a fine powder, called flowers, as the flowers of sulphur. In some cases the vapor is changed chemically by contact with the oxygen of the air, when the sublimate is of a different composition from the original body, as when oxide of zinc is produced by subjecting the metal, or its ores, to heat exposed to the air.

SUBMARINE NAVIGATION (sub-ma-

rēn' năv-ĭ-gā'shŭn). See Torpedo Boat. SUCCESSION WAR (sŭk-sĕsh'ŭn), the general name given to an armed conflict resulting from rival claims of succession to the throne. Four of such wars are historical, since they disturbed the peace of Europe and were accompanied by great loss of life and property. These wars rose from the conflicting claims to the thrones of four countries, those of Spain, Poland, Austria, and Bavaria, in the order named.

THE WAR OF THE SPANISH SUCCESSION began in 1701, after the death of Charles II., who died childless. Louis XIV. of France, son of the eldest sister of Philip IV., and Emperor Leopold I. of Austria, son of a younger sister of Philip IV., were the principal claimants to the throne. Fearing that the union of Spain with Austria or France would disturb the balance of power in Europe, other nations became interested in the conflict. Leopold transferred his claims to his second son, the Archduke Charles, and a majority in Spain favored the Austrian party, but Louis nominated Philip of Anjou, his grandson, and the latter was recognized as the heir. He proceeded to Spain shortly after the death of King Charles and was recognized as monarch, in 1700, and Leopold immediately sent an army to Italy under Prince Eugene, who defeated a French army at Chiari the following year. Louis XIV. unwisely recognized James Edward Stuart, the Pretender, and this caused William III. of England to enter an alliance with Holland and Austria against France. However, Bavaria and some of the other German states joined the Bourbons of France and Spain. Queen Anne succeeded to the English throne in 1702 and continued the policy of William by declaring war.

Marlborough, with an allied army of Dutch, English, and Germans, in 1702, invaded the Spanish Netherlands. At the same time the Margrave of Baden invaded France, but was defeated by Villars. The armies under Eugene and Marlborough were united, in 1704, and at Blenheim defeated the Franco-Bayarian army under Tallard. About the same time the English captured Gibraltar and Barcelona. In 1706 the French and Bavarians under Villeroi were defeated at Ramillies by Marlborough, and Eugene won a brilliant victory over the French under Marsin at Turin. Archduke Charles had previously, in 1704, invaded Spain by crossing Portugal from Lisbon, and the Bourbon forces were driven across the Pyrenees, to which Peterborough with an English army contributed materially. In the Netherlands, at Oudenarde, in 1708, Eugene and Marlborough defeated a large army of Bourbons, and the following year they gained a victory over Villars at Malplaquet.

An armistice was concluded between England and France in 1712, but Eugene, aided by Holland, carried on the war. Prussia, Holland, England, and Savoy agreed to the Peace of Utrecht, in 1713, and the war closed the following year with the Treaty of Baden. Philip was left in possession of the throne of Spain; Gibraltar and Minorca were ceded to England, which received Arcadia from France; Austria received Naples, Sardinia, the Duchy of Milan, and the Spanish Netherlands; Savoy received Sicily; and it was agreed that the crowns of France and Spain should not be united in the same person. Queen Anne's War is the name applied in America to the conflict between the French and English as a part of the War of the Spanish Succession.

THE WAR OF THE POLISH SUCCESSION began in 1733, immediately following the death of Augustus II. of Poland and Saxony. Stanislas Leszczynski was elected king by the diet, but the nobles preferred Augustus, son of the late king, who was supported by Austria and Russia. Stanislas was supported by France, which country declared war upon Austria and invaded Lorraine. In the meantime Sardinia took up arms against Austria and Spain undertook the conquest of the Two Sicilies, which it had lost by the War of Spanish Succession. The Austrians were defeated at Bitonto in 1734 and were compelled to relinquish the Two Sicilies. Augustus III. was made King of Poland, but the duchies of Lorraine and Bar were assigned to Stanislas for life.

THE WAR OF THE AUSTRIAN SUCCESSION began in 1740, after the death of Charles VI. Maria

Theresa ascended the throne with the support of most of the powers, but Frederick the Great seized Silesia, while Charles Albert of Bavaria claimed the throne of Austria as a descendant from Ferdinand I. The latter was crowned emperor in 1742 as Charles VI., and was supported by Prussia, France, Bavaria, Spain, Saxony, Sar-dinia, and Naples. Maria Theresa had the united support of Austria, Hungary, England, and Holland. The policy of France to gain unusual advantages caused Frederick to become displeased and as a result Saxony and Prussia concluded the Peace of Dresden with Austria. thus terminating the second Silesian War. Marshal Saxe gained substantial victories in the Austrian Netherlands, where he defeated the allied army of English, Dutch, and Austrians. Charles VII. died in 1745 and his son, Maximilian Joseph, relinquished his claim to the throne of Austria and concluded peace. Francis I., the husband of Maria Theresa, was elected emperor in the same year. Marshal Saxe won several successes against the Austrians, but peace was finally concluded at Aix-la-Chapelle in 1748. By the terms of this treaty the Hapsburgs lost Silesia, which became a part of Prussia. Spain received Parma and Piacenza. In America this contest is known as King George's War, during which the French lost Louisburg, in 1745

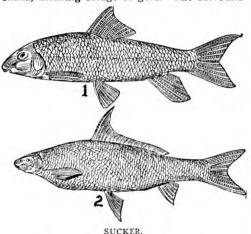
The War of the Bavarian Succession followed the death of Maximilian Joseph of Bavaria, in 1777. Having no legitimate heirs, Charles Theodore of the house of Wittelsbach claimed the throne. He was supported by Joseph II. of Austria, but was opposed by Frederick the Great, who declared war and invaded Bohemia. Saxony supported Prussia. Catharine II. of Russia was hostile to Austria, which induced Maria Theresa to conclude the Treaty of Teschen in 1779. As a result of this treaty the crown of Bavaria passed to Charles Theodore, while Saxony received a money indemnity, and Austria was given a small district on the east side of the Inn.

SUCHAU. See Soochow.

SUCKER, a genus of soft-rayed fishes of the carp family, having the mouth usually protractile, with thick and fleshy lips adapted for sucking in food. About thirty species are found in the fresh waters of America, of which the common sucker is the most abundant. It attains a length of twelve to eighteen inches and, like other species of suckers, is hard to catch with a hook, owing to its difficulty in taking bait. The buffalo sucker is two to three feet long and is found in the large rivers of the Mississippi valley. These fishes are somewhat bony, but quite well flavored. They are caught mostly with nets. The largest of the genus is the Missouri sucker, which is from two to four feet long. See illustration on following page.

SUCRE (soo'krå), or Chuquisaca, the capital of Bolivia, situated on a tableland 8,975 feet

above the sea, 125 miles southeast of Lake Poopo Choro. The streets are regularly platted and well improved by grading and paving. Among the noteworthy buildings are the cathedral, the national university, the school of industrial arts, and several colleges of arts and sciences. The city was founded by Pedro Auzures, an officer of Pizarro, in 1538. It occupies the site of an Incas town called Choque Chaka, meaning bridge of gold. The surround-



1, Common Sucker; 2 Missouri Sucker.

ing country contains valuable deposits of silver and other minerals, but the most noteworthy mines are those producing silver ores. It has a considerable inland trade and manufactures of clothing, furniture, hardware, jewelry, and machinery. The Pilcomayo River has its source in the vicinity of the city, and in the region of its headwaters are valuable forests and soil of con siderable fertility. The inhabitants are mostly of Spanish extraction, but a considerable portion of the people are Indians. Population, 1917, 40,500.

SUDAN (soo-dan'), or Soudan, the Arabic name of a vast region in Central Africa. It is bounded on the north by the Sahara Desert, east by Egypt and Abyssinia, south by the Congo Free State, Cameroon, and Upper Guinea, and west by Senegambia. The Sudan has an area of about 2,500,000 square miles and a population variously estimated from 15,000,000 to 80,000,000. The inhabitants are mainly of Negro blood, differing in stature and habits and slightly in color, according to the region occupied. They are classed mainly as to location in the three general divisions known as Western, Central, and Eastern Sudan. In Western Sudan the French have obtained the predominating influence, chiefly by moving eastward from Senegambia. This region includes a large part of the Niger and Senegal valleys and is divided into a number of native states, but all are now more or less tributary to the French.

Central Sudan embraces the northern part of

the Niger Territories, Cameroon, and French Congo, and the regions tributary to Lake Tchad. The drainage is almost exclusively into Lake Tchad, which has no outlet to the sea, but a portion of the southern region is drained into the Niger and Congo rivers. Eastern Sudan, often called the Egyptian Sudan, includes the divisions known as Darfur, Kordofan, Senaar, and several others, thus including a part of the upper Nile region and the towns of Khartoum and Fashoda. The Sudan region may be described as being moderately elevated and diversified by rolling plains, level plateaus, and somewhat elevated highlands in the southwest. In the northern part are many sandy wastes extending from the Sahara, but there is a gradual transition to the well-watered and arable interior, and the height of fertility is reached in the vicinity of 10° north latitude.

The distribution of plant and animal life in the Sudan is greatly varied, owing to vast difference in the soil, climate, and distribution of moisture. Among the principal productions are corn, sugar, tobacco, rice, cotton, indigo, and many kinds of fruits. Cattle, horses, sheep, camels, and goats are reared in many sections, especially by the people of Arabic extraction. Honey made by wild bees forms an important article of commerce. Ostrich feathers, ivory, rubber, palm oil, wax, iron, gold, silver, gums, salt, timber, and building stone are obtained in abundance. In many sections large herds of wild animals are met with, especially elephants in the swamp regions of Lake Tchad, the rhinoceros in the Wadai, crocodiles in the large rivers, and the zebra, antelope, giraffe, and wild ass in the eastern steppes. In some regions are vast numbers of hippopotami, monkeys, serpents, birds of song and plumage, and fish.

A large part of the Sudan is still under government by native chiefs, but within recent years the French, Germans, Portuguese, and English have established protectorates or annexed different tracts to their colonial possessions. Portuguese influence has been manifest largely through the Congo Free State, English through Egypt and the Niger Territories, German from Cameroon, and French from Senegambia. Trade stations have been established in all the sections tributary to water courses, or caravan routes, and railroad building has made material progress.

SUDERMANN (zoo'der-man), Hermann, novelist and dramatist, born in Matzieken, Germany, Sept. 30, 1857. After attending a gymnasium and attaining a university education, he became a journalist in Berlin, where he wrote for a small weekly news and society paper. In a few years he severed his connection with that periodical and engaged in writing novels. The first three of his writings published before 1889 include "In the Twilight," "Dame Care," and "The Cat's Way." His first eminent success was attained by publishing "Honor," a drama that appeared in 1890. In 1893 he published his drama entitled "Home," which was made famous by Sarah Bernhardt in France. It has been translated into Italian, English, Russian, and several other languages. Other writings from his pen include "Battle of the Butterflies," "Happiness in a Corner," "Sodom's End," and "Three Feathers."

SUE (sū), Marie Joseph Eugene, eminent novelist, born in Paris, France, Dec. 10, 1804; died at Annecy, France, Aug. 3, 1857. He was the son of a physician to Napoleon and, after receiving an education for the profession of surgery, entered the service as an army surgeon in 1824. He served in the French expedition to Spain in 1828, but was transferred to the navy, and personally witnessed the Battle of Navarino in 1828. The death of his father in the following year brought him into possession of a considerable fortune, and he began to use his military experience in writing novels. The first decidedly successful work from his pen was "The Mysteries of Paris," which he published in 1842 in the Journal of Debates, but soon after it was issued in an edition of ten printed volumes. Sue is best known by his work entitled "The Wandering Jew," which has since been widely translated and reissued from time to time. He displayed power and genius in most of his writings and developed an immense popularity, but some of his works are not of substantial value. In 1850 he became a deputy in the French assembly, but on the accession of Napoleon III. the following year he retired from public life. Among his writings not named above are "Mysteries of the People," "Seven Capital Sins," and "Jean Cavalier." Sue was influential as a member of the constitutional assembly, but withdrew and settled in Annecy.

SUETONIUS TRANOUILLUS (swe-to'nī-us), Gaius, historian, born in Rome about 70 A. D.; died about 160. It is not certain when he was born, but it is probable that the time of his birth was near the beginning of the reign of Vespasian. Emperor Hadrian employed him in an official capacity, chiefly as private secretary, but he was dismissed because of being intimate with the Empress Sabina. The remainder of his life was probably devoted to literary pursuits, since he is the author of numerous works. His chief work, entitled "Lives of the Twelve Caesars," gives an account of the twelve Roman emperors from Julius Caesar to Domitian. The domestic customs and gross excesses of the emperors are related minutely, a marked feature that renders this production of great value.

SUEZ (soo-ez'), a seaport in Egypt, at the Red Sea terminus of the Suez Canal, 75 miles east of Cairo, with which it has railroad connection. It was a small Arab village of little importance until the Suez Canal was constructed and a canal was built from the Gulf of Suez to the Nile, but it is now the seat of considerable trade. Suez has immense store and ware houses, a good harbor, and a large stone causeway to

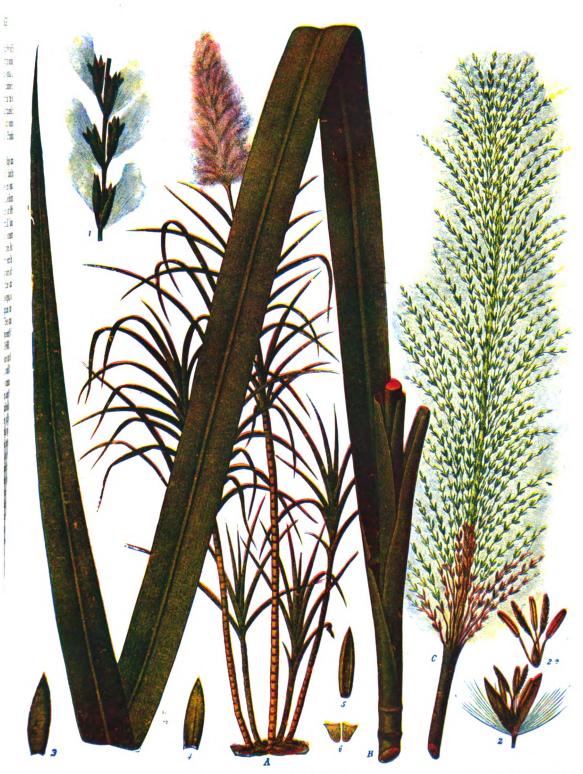
carry the railroad to the harbor of Port Ibrahim. The noteworthy buildings include a handsome Greek church, two hospitals, a customhouse, several schools, and a number of government buildings. A canal from the vicinity of Suez to the Nile was maintained in ancient times by the Ptolemies, but at various periods fell into a state of decadence. Population, 1907, 18,347; in 1912, 19,041.

SUEZ CANAL, the great ship canal across the Isthmus of Suez, a strip of land that separates the Red and Mediterranean seas. It extends from Port Said on the Mediterranean to Suez on the Red Sea, a distance of 98 miles, 2'. miles of which consists of small lakes. The honor of conceiving the idea of constructing a ship canal without locks across the Isthmus of Suez is due to Napoleon I., a project he formed when the French occupied the town of Suez in A concession to build the canal was granted to M. Ferdinand de Lesseps, a French engineer, in 1854, and work began under his direction on April 25, 1859. The canal cost \$90,000,000 and was formally opened for the passage of vessels on Nov. 17, 1869. It was originally from 196 to 327 feet wide at the surface, 72 feet wide at the bottom, and 26 feet deep, but a large increase in the canal traffic has caused the commission to widen and deepen it materially. Side basins are maintained in several places to facilitate the passage of vessels.

In 1887 a system of electric lights was stationed along the canal to facilitate the movement of vessels at night. Steamships sail at a speed of from five to six knots an hour and require sixteen to twenty hours in making the passage, which costs about \$500. The canal is under the direction of a canal commission, which has a lease of the land on both sides of the canal for 99 years and holds annual meetings at Paris. Few American merchant vessels use the canal, but it is the seat of a remarkable traffic, the majority of which is carried by English and German vessels. About 4,000 vessels pass through the canal annually, having a gross tonnage of 14,500,000 tons and paying about \$22,575,000 in tolls. A fine bronze statue of Lesseps was unveiled at Port Said on Nov. 17, 1899.

SUFFOLK, county seat of Nansemond County, Va., 22 miles southwest of Norfolk, on the Nansemond River and on the Southern and other railroads. It has iron works, railroad shops, hosiery mills, and fine public buildings. Population, 1910, 7,008.

SUFFRAGE (suf'fraj), the privilege of participating in the government of a state or nation by voting at an election for officers or a change in the fundamental law. Two theories have been advanced regarding the suffrage, one of which implies that it is a privilege extended by the government to be exercised under certain restrictions, and the other that it is a natural right, like liberty. The latter has come to be the common view held by people of progressive



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472 SUGAR CANE. COPYRIGHT IN (Sacebarum officinarum).

(Opp. Sugar Cane) A. Plant (reduced), B. Part of Stem, with Leaf C. Inflorescence, 1-6. Parts of Flower



nations, but the former principle is the one on which the majority proceed in practice. Suffrage was limited more or less in the English colonies of North America. The general limitations included that the individual must be a male freeholder, possess property of a certain value, or pay taxes of a certain amount. These restrictions were gradually removed after the Revolution, but the Constitution rests in the several states the right to fix the qualification of the voters. In Canada, especially since 1917, the

women have large political rights.

The Fourteenth Amendment to the Constitution provides for the reduction of representation of a State in Congress, in proportion to the number of citizens deprived of suffrage, except for crime. This was intended to guard against the disfranchisement of the Negro population The Fifteenth Amendment forbids the denial to a citizen of the right to vote on account of race, color, or previous condition of servitude. This amendment does not guarantee a vote to every citizen, but provides that, if any citizen vote, others shall not be forbidden to vote for any of the above reasons. Male suffrage was provided for by the states as soon as they were formed, but there are still restrictions of various kinds, among them the payment of taxes, ability to read and write, and several others. The territories have no voice in the Federal elections, and neither have the inhabitants of the District of Columbia, which is under the immediate control of Congress. Female suffrage has been placed on an equality with male suffrage in several of the states and some form of suffrage has been given women in nearly all, especially relating to schools. Women have full suffrage in Alaska, Arizona, California, Colorado, Idaho, Illinois, Kansas, Montana, Nevada, New York, Oregon, Utah, Washington, and Wyoming.

SUGAR (shoog'er), a sweet, crystalline compound derived chiefly from the juice of the sugar cane and sugar beet. However, it occurs in many other vegetables. Among the various sources of sugar are the sap of some trees, the seed, flowers, and fruits of some plants, the juices of various roots and grasses, and the milk of animals. Sugar was first made from sugar cane in India, whence the art of manufacture was carried to Arabia, and later it was introduced by the Moors into Spain. The Spanish colonists brought sugar cane to the West Indies, where it proved a plant of great value, and in 1751 it was introduced for culture in Lou-

SUGAR CANE. The plant known as sugar cane is not met with in a wild state, but is thought to be a native of tropical Asia, where it was developed by carefully cultivating allied species The leaves are broad, smooth, and of grasses. from three to five feet long. The stems have a shining effect, growing usually to a height of seven to twelve feet. Within the stem is a sweetish pith, which supplies the juice essential

in the production of sugar. It requires a rich soil and an abundance of moisture during the growing season. Low land is the most suitable, especially where the soil is of a rich, alluvial character. The plants are propagated by cuttings of the top joints, which are planted in rows five to seven feet apart.

CANE SUGAR. About one-half of the sugar sold on the market is obtained from sugar cane.

The stems are first stripped of their leaves and the seed tops are clipped off, and they are then cut a short distance above the ground. After expressing the juice from the stems by means of a cane mill, it is conducted into tanks and carefully strained into a receptacle. From this it is drawn off into a series of pans to be evaporated by heat until it becomes granular, after which the dry sugar is separated from the syrup by means of machinery. In the ordinary process of evaporating the juices, common



SUGAR CANE.

brown sugar is formed, usually called raw sugar, and this needs to go through a refining process before the higher grades of marketable sugars are obtained. This is done usually by dissolving the raw sugar in hot water, and, after adding a solution of lime or sulphuric acid, it is passed successively through bags made of cloth and through animal charcoal, which serve to remove all impurities and take out the color. The liquid mass is then boiled a second time to take out the dampness, and the sugar crystals resulting are perfectly white.

Granulated sugar is made by separating the syrup from the crystals in a machine that revolves rapidly. By placing small quantities of the granulated sugar, before it is completely dry, into molds and drying, lump sugar results. Loaf sugar is the product which is obtained when the refined liquid sugar is evaporated in pans. Many widely different processes are employed in manufacturing sugar, several distinct kinds of machinery being used in the making of the various classes of products. Cane mills are usually constructed with two or three rollers, between which the sugar cane is crushed and the juice is collected in pans below. Horse power is used

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to propel the mills in small plantations, but in the larger establishments steam power is applied.

BEET SUGAR. Beet sugar is a product of the sugar beet, the juice of which yields from 10 to 20 per cent. of sugar. It is made in practically the same way as cane sugar after the juice has been secured by crushing the root. The product obtained from the sugar beet has entered very largely into direct competition with the product secured from the sugar-cane plantations of the West Indies, the East Indies, Australasia, and the tropical regions of America, Asia, and Africa. Germany is at present the largest producer of beet sugar, the annual yield averaging about 1.975,000 tons. The countries taking next rank are Austria-Hungary, France, Russia, Belgium, Holland, and the United States. Austria-Hungary produces annually about 1,200,000 tons, and France, 850,000 tons. In 1917 the United States produced 250,000 tons of beet sugar and about an equal amount of cane sugar. The beet-sugar industry has made rapid progress in Canada the last decade, notably in Ontario.

OTHER CLASSES OF SUGAR. A fine quality of sugar is made from the sugar maple, especially in New England, Ohio, West Virginia, New York, Pennsylvania, New Brunswick, and Ontario. The sap of the sugar maple is obtained in the spring as the sap flows upward, and is evaporated and treated quite like the sap obtained from other sources. Large quantities of maple sugar are used in making confections. A class of sugar known as jaggery is obtained from several species of palms. It is a dark colored raw sugar and is produced in comparatively large quantities. Other plants which yield sugar include the sorghum plant and the ordi-

nary field or Indian corn.

Consumption of Sugar. The total consumption of sugar in the world, in 1916, was 14,500,000 tons, of which 7,190,000 tons were beet sugar. Much of the raw sugar consumed in the United States is imported and refined by domestic manufacturers. The annual consumption in that country averages 2,525,000 tons, of which only about 20 per cent. is wholly of domestic production. In 1908 the consumption was 2,519,847 tons, or 65.2 pounds per capita, of which 1,950,014 tons were imported. England consumes 91.6 pounds of sugar per capita, the largest in the world. Switzerland consumes 60.3 pounds; Canada, 54; Sweden, 38; France, 36; Germany, 34; and Russia, 14.

Composition of Sugar. Sugar is composed of various proportions of oxygen, carbon, and hydrogen. The constituents in all kinds of sugar are the same, but they differ materially in the relative quantities. Grape sugar occurs in the juices of various fruits, such as the currant, apple, peach, and grape. It varies in quantity from 1 to 15 per cent. Glucose, or starch sugar, is a kind of grape sugar and is made by boiling starch in sulphuric acid and water, the action of the acid being to unite some of the oxygen and

hydrogen of the water with the carbon, thus forming a syrup. The acid is afterward removed by adding carbonate of lime, which operates to combine the sulphuric acid with the lime and thus frees the carbonic acid. Afterward the sugar is crystallized by boiling the mixture and thereby evaporating the water. Other sugars are those made of barley, honey, and various allied substances. See Beet; Molasses; Sorghum.

SUGAR CANE. See Sugar.

SUICIDE (sū'i-sīd), the crime of a person who kills himself with malice aforethought. Suicide is uncommon, though not entirely unknown, among uncivilized peoples. It is resorted to more generally in the highly civilized countries than those that rank as semicivilized, and the crime appears to have gained in extent more rapidly within the last century than at any other equal period in the world's history. Although the ancients did not regard suicide a crime or even as dishonorable, it was less common anciently than now. That this means of ending their lives was chosen by Demosthenes, Cleopatra, Hannibal, Mark Antony, and Themistocles is assigned to some event in their lives or marked changes in conditions, such as caused them to act from the impulse of despair. On the other hand, the Scriptures furnish numerous examples of suicides through revenge or remorse, such as those of Samson and Judas Iscariot.

Suicide is usually looked upon as the result of insanity, or as a symptom showing that the brain is diseased. Some writers are inclined to look upon the act with such dread, both from the standpoint of ending mortal existence wrongfully and from the viewpoint of passing into eternity under the most unfavorable circumstances conceivable, that they regard suicide by a sane person impossible. On the other hand, there are writers who believe a sane person may commit the act after careful deliberation and as considerately as he might consummate a matter of business. However, the majority of suicides are known to be due to melancholy and the excessive use of intoxicants, such as opium and alcohol. Statistics show that two-fifths of those suffering from melancholia make suicidal attempts upon their lives. Those engaged constantly in work or under the heavy pressure of business, especially where they are exposed to worry and strenuous competition and are barred from a calm consideration of the higher phases of life, are exposed to the dangers of this crime. Frequently suicide is suggested during a state of excitement by the sight of means to destroy life, such as a weapon or a torrent of water. The tendency is undoubtedly inherited in many instances, since suicides, like some diseases, may be traced to a number of members belonging to the same family. An attempt to commit the crime is punishable in some countries, as in a number of the states of the United States. Formerly the laws of England worked a forfeiture of the goods and chattels belonging to the suicide and the body was buried ignominiously, usually with a stake thrust through it, but this practice fell into disuse at the time of George IV.

Suicides are more numerous among men than among women, the proportion being about three to one. Children at the age of five years have committed the act, and even persons over ninety, but the greatest number occur between the ages of 40 to 44. Suicides are more numerous among single than among married people, and the rate is higher in large cities than in towns and country districts. The greatest percentage is among military men, but the rates are comparatively high in the professional and commercial classes. Laborers are less prone to the act than artisans. The principal means of ending life are hanging, shooting, drowning, poisoning, and jumping from heights.

The notable suicides mentioned in history include the following:

Sappho B.C. 7th C.	Marcus Salvius Otho 69
Themistocles449	Thomas Chatterton 1770
Empedocles435	Robert Clive
Demosthenes322	Charles Pichegru 1804
Hannibal183	Sir Samuel Romilly 1818
Mithridates 63	Robert Stewart
Cato the Younger 46	Castlereagh
Brutus and Cassius 42	Admiral Robert Fitzroy, 1865
Mark Antony 30	Louis II. of Bavaria 1886
Cleopatra 30	Crown Prince of
A. D.	Austria1889
Judas Iscariot 29	José Manuel Balmaceda. 1891
Nero 68	Georges Boulanger1891

SULIOTES (soo'le-ots), the name of a race of people who occupied the valley of the ancient Acheron, in European Turkey, where they settled in the 17th century to escape the oppression of the Turks. They descended from Greek and Albanian shepherds and were named Suliotes from the mountains of Suli in the south of Albania, where they supported themselves by rearing cattle and pursuing agricultural arts. By the close of the 18th century they had increased to considerable numbers and were successful in resisting the attacks of the Turks. Their government was in the form of an independent republic, with the center of influence at the village of Suli, which was finally taken by the Turks in 1822, and the Suliotes moved southward to different parts of Greece. An effort was made to regain their former possessions by Marco Bozzaris, but he was ultimately required to retreat into Greece. The Congress of Berlin, in 1878, recommended that the region formerly occupied by them should be annexed to Greece, but this recommendation was not complied with.

SULKY (sŭlk'ỹ), a light vehicle with two wheels, fitted with a seat for one person and drawn by a single horse. Vehicles of this class are used extensively for training horses or driving them in races. The driver occupies a seat quite near the horse, usually over the rear end of the shafts. Sulkies of modern construction are very light, and the better grade have ball bearings and pneumatic tires.

SULLA (sŭl'la), Lucius Cornelius, Roman dictator, born in 138; died in 78 B. C. His father was a poor nobleman, but he had the advan-

tages of a good education, and later a fortune was left to him by a relative, thus facilitating his promotion to rank and office. He was made questor in 107 B. C., and with a force of cavalry proceeded to Africa to assist Consul Marius in the Jugurthine War. His eminent ability brought about the capture of King



LUCIUS C. SULLA.

Jugurtha, whom he brought in chains to Rome the following year, and from 104 to 102 he took part in the Cimbrian War. His efficient services caused him to be made pretor in 93, but a prolonged quarrel between him and Marius led to the social war from 90 to 88, in which he secured fame for gallant service and was accordingly made consul. His command included the province of Asia, where he had charge of the second war against Mithridates, but most of the actual warfare was conducted against Archelaus in Greece, who was an active ally of Mithrida-After defeating Archelaus in the great Battle of Chaeronea, in 86, he crossed the Hellespont and compelled Mithridates to conclude terms of peace, and in 83 returned to Italy.

Although Marius had died in 86, the property of Sulla had been confiscated by the strong party of Marius and he had been proscribed. Accordingly he was obliged to fight the Battle of Brundusium shortly after landing on the Italian shore, and, after gaining successive victories, marched into Rome in 82, where he immediately proscribed 3,000 of his enemies and put a large number of prisoners of war to death in the Roman circus. Sulla being now master of Italy and the Roman world, a reign of terror followed, and the power of the people was lessened by strengthening the functions of the senate. He was appointed dictator in 81, a position he held three years, after which he resigned to enjoy ease and sensual pleasures on his fine estate at Puteoli. In his closing years he practiced a high degree of debauchery and hastened his death. It was his common boast that he avenged every wrong inflicted by an enemy, and repaid every act of kindness accorded to him by his friends.

SULLIVAN (sŭl'lĭ-van), Sir Arthur Seymour, composer, born in London, England, May 13, 1842; died Nov. 22, 1900. His father was a bandmaster at the training school for British military bands. After taking a course of instruction in his native city, he proceeded to Leipsic, Germany, where he studied at the Conserva-

torium for three years. He returned to England in 1861 and prepared the music to Shakespeare's "The Tempest." Soon after he wrote music for other Shakespearean plays, including "The Merchant of Venice," "The Merry Wives of Windsor," and "Henry VIII." In 1864 he wrote the cantata "Kenilworth," which was produced with much success at the Birmingham festival. He was principal of music in the Royal College from 1867 to 1881, and within that period produced many of his excellent compositions. The most celebrated of his comic operas is "Pinafore," which had a run of 700 consecutive nights in London and was played in New York at four different theaters for months at a time.

Sullivan was the idol of London for many years, officiating as director of music in all of England's public affairs for nearly a quarter of a century. The queen knighted him at Windsor, in 1883, and he was awarded the cross of the Legion of Honor of France in 1878 while officiating at the Paris Exhibition. He was the recipient of degrees from Cambridge and other noted universities. Among his productions not mentioned above are "The Pirates of Penzance," "Princess Ida," "The Mikado," "Gondoliers,"
"Patience," "Iolanthe," "The Sorcerers," and
"Ruddygore." His oratorios and sacred musical dramas include "The Prodigal Son," "On Shore and Sea," "The Golden Legend," "The Light of the World," "The Martyr of Antioch," "In Memoriam," and "Te Deum." He served a number of years as musical editor of church hymns.

SULLIVAN, John, soldier, born at Berwick, Me., 1740; died Jan. 23, 1795. He studied law and practiced his profession, but volunteered his services for the American cause in the war of independence. In 1774 he aided in the capture of Portsmouth, N. H., and the following year was made a brigadier general. He commanded the army that invaded Canada in 1776, but, after an unsuccessful attack of Three Rivers, he joined Washington at New York. The same year he was made major general and commanded in the Battle of Long Island and subsequently took part in the battles of Trenton, Princeton, Brandywine, and Germantown. In 1778 he commanded at the siege of Newport, where he was aided by the French fleet, and subsequently fought against the Tories and Indians in New York. He was elected to Congress in 1780, was President of New Hampshire from 1786 to 1789, and later served as United States district judge in that State.

SULLIVAN'S ISLAND, an island six miles below Charleston, S. C., lying between its harbor and the ocean. It is the site of Fort Moultrie and is a popular summer resort and residence of Charleston business men. Ferryboats connect it with Charleston. Fort Moultrie was evacuated on Dec. 26, 1860, by Major Anderson.

SULLY (sŭi'li), James, educator, born at Bridgewater, England, March 3, 1842. He studied

at Independent College, Taunton, and Regent's Park College, London, and subsequently took advanced courses in the universities of Berlin and Göttingen. In 1892 he was made professor of philosophy of mind and logic in University College, London, where he served with eminent success a long term of years. He ranks as one of the most eminent psychologists of England, and a number of his books have been used extensively in Europe and America as educational texts. They include "The Teacher's Handbook of Psychology," "Sensation and Intuition," "The Human Mind," "Studies of Childhood," "Essay on Laughter," and "The Children's Ways."

SULLY, Maximilien de Béthune, Duke of, Marshal of France, born at Rosny, France, in 1560; died Dec. 22, 1641. He descended from a distinguished family of wealth and influence, and under the direction of Henry of Navarre received an excellent education and military training. In 1575 he narrowly escaped the Saint Bartholomew massacre, and afterward exerted himself with great valor in several important battles. King Henry selected him as counsellor of state and finance in 1594, in which capacity he not only reduced taxation, but greatly decreased the national debt, encouraged agriculture, and extended commercial enterprises. He was created Duke of Sully and in 1606 was made a peer of France. He resigned the superintendence of finance shortly after the murder of Henry IV., in 1610. Richelieu recalled him to public service in 1634 and made him Marshal of France. He wrote several treatises on war and police and published his personal "Memoirs.

SULPHATES (sŭl'fats), the salts of sulphuric acid, some of which occur as native minerals, while others are prepared artificially. The sulphates of aluminum are of value commercially and embrace the alums, a class of double salts, formed of aluminum sulphate with the sulphates of ammonia, potash, or soda. Ammonium sulphate is made largely from the ammoniacal liquor of gas works, and is employed as a fertilizing agent. Nickel sulphate consists of green crystals and is used in nickelplating. The sulphate of quinine is employed in medicine; the sulphate of zinc, or white vitriol, is used in surgery and in calico printing; and the sulphate of iron, or green vitriol, is of great value in medicine, for making inks and dyes, and in calico printing. The sulphate of copper, or blue vitriol, is used in preparing green coloring matters and in surgery. Other important sulphates include those of cobalt, calcium, mercury, silver, and uranium.

SULPHONAL (sŭl'fō-nal), a substance used in medicine to produce sleep. Though poisonous in its nature, it is harmless as a hypnotic agent when administered in proper quantity. It is best taken with hot milk, since it is not highly soluble in water. Its advantage over chloral is that it has no depressing influence upon the action of the heart. If taken in excessive doses,

it is liable to cause eruptions of the skin and various functional disorders.

SULPHUR (sŭl'fŭr), a nonmetallic element of a lemon-yellow color, which is widely diffused in the mineral kingdom, both in the free state and in combination with other substances. Metallic sulphates and metallic sulphides are the terms applied to substances that contain it in combinations, hydrated sulphate of lime being the most abundant of the former and metallic ores of the latter. Elementary sulphur is met with extensively in the organic world, forming an essential component of the albuminoids, a class of compounds occurring both in animal and vegetable structures. Animal hairs contain about 4 per cent. of sulphur. The essential oils of garlic, onion, and mustard embrace a considerable quantity. Sulphur in the free state is most abundant in volcanic regions, the most extensive deposits being in Sicily, where about 400,000 tons are produced annually. Extensive deposits occur in California, especially in the vicinity of Borax Lake, and in Canada, Mexico, Iceland, Germany, France, Italy, and Spain.

Sulphur has neither taste nor smell, is a poor conductor of heat and electricity, and is not soluble in water. When rubbed or melted, it emits a peculiar odor, and may be easily melted and volatilized. It fuses at 257°, and, when its temperature is raised to 790°, it rises in vapor that condenses in the form of a fine yellow powder known as flowers of sulphur. Roll sulphur, or brimstone, is made by melting and pouring it into molds. It takes fire in the air at a temperature below redness. Its combustion is attended by disagreeable fumes and in unison with oxygen it forms sulphur dioxide, called also sulphurous acid gas and sulphurous oxide. unites directly with other elements when highly heated, which may be seen by the circumstance that copper burns brightly in sulphur vapor. Sulphur is used in the manufacture of matches, gunpowder, and sulphuric acid. It serves an important purpose in bleaching, in vulcanizing India rubber, and in many other operations. The chief sources of supply in North America are in Louisiana, Nevada, Texas, California, and Ontario. Some of the most productive sulphur mines of the United States are in Calcasieu Parish, Louisiana.

SULPHURETED HYDROGEN (sŭl'fûrět-ěd hī'drō-jěn), an inflammable gas found in certain mineral waters and produced by the decomposition of organic matters that contain sulphur. It is emitted during a volcanic eruption, and may be produced artificially by burning sulphur vapor in hydrogen. The odor is nauseous and the substance is deadening if it is inhaled in large quantities. During volcanic action it sometimes overcomes man and animals. Sulphureted hydrogen is colorless, is soluble in water and alcohol, and has the property of turning blue litmus paper red. This gas is somewhat heavier than air and, if mixed with 1.5 volumes

of water and ignited, it explodes. It is used in analytical chemistry and for the manufacture of metallic sulphides. In some instances it is employed to purify sulphuric acid. Sulphureted hydrogen is called hydrogen sulphide and hydro-

sulphuric acid by some writers.
SULPHURIC ACID (sŭl-fū'rĭk), or Oil of Vitriol, an acid discovered in the latter part of the 15th century by Basil Valentine (born about 1414). It is a colorless, oily liquid. Sulphuric acid is tasteless, reactive, and intensely acid. When coming in contact with animal and vegetable substances, it has the effect of quickly charring them. The specific gravity is about 1.72. It is soluble in water, for which it has so strong an affinity that it causes the formation of water in many substances which do not contain that element. Sulphuric acid is obtained in small quantities by boiling sulphur in nitric acid, but it is produced on a larger scale by the distillation of green sulphate of iron, and by the oxidation of sulphurous acid through the agency of nitric acid and hyponitric acid. There are many uses of sulphuric acid, especially in making alum, soda, and phosphorus. It is employed in refining petroleum, in making fertilizers, and in treating typhoid fever and many other diseases.

SULPHUR SPRINGS, county seat of Hopkins County, Tex., 78 miles east of Dallas, on the St. Louis Southwestern and other railroads. The industries include cotton gins, brick yards, and grain shipping. Among the chief buildings are the courthouse, high school, and city hall. It is so named from its sulphur-laden springs. It was incorporated in 1888. Pop., 1910, 5,151.

SULTAN (sŭl'tan), an Arabian word, meaning mighty one, applied as the title to the Emperor of Turkey. The mother of the eldest son of the Sultan is called the hasseki sultan, and

the term sultana is applied to women.

SULU ISLANDS (soo-loo'), or Jold Archipelago, an island group of the Philippines, lying between Mindanao and Borneo. The northern coasts are washed by the Sulu, or Mindora, Sea, and its southern, by the Celebes Sea. It includes about 150 islands. All are of volcanic origin. The area is given as 1,050 square miles. The chief island is Cagayán Sulu, with a length of 36 miles and a breadth of 12 miles. It contains the town of Sulu, or Joló. The archipelago is divided into three divisions, known as the Sulu, Tapul, and Tawi Tawi groups.

The soil is generally fertile and the climate is favorable, but the archipelago is subject to hurricanes. Among the productions are rice, tropical fruits, gum mastic, timber, coffee, pearl shells, edible birds' nests, resins, and various minerals. Horses, cattle, goats, and buffaloes are grown in abundance. The inhabitants are mostly of Malay descent and the chief religion is Mohammedan, whose adherents are known as Moros. Spain long claimed sovereignty of the islands, but they were ceded, along with the Philippines, to the United States in 1898. The

SUMAC

archipelago has innumerable villages and several growing seaports. Population, 1918, 52,836.

SUMAC (su'măk), or Sumach, a genus of trees and shrubs, which includes about fifteen species that are native to North America. About 100 species have



in the coldest regions. In the Virginian sumac, which is found in many sections of North America, the leaves are pinnate and the flowers are small. The wood and bark yield an acrid juice of value in the arts. In most species

the flowers are

been described.

most of which

are widely dis-

tributed, except

are followed by a group of reddish-colored fruit. In early autumn the leaves assume a scarlet hue and soon fall to the ground. The most widely distributed species is the smooth-leafed sumac of the United States, which grows to a height of ten or twelve feet. It yields properties of value in tanning and for medicine. The poison oak of North America is a shrub from one to four feet high, and a closely related species known as poison ivy is a vine quite largely distributed. Swamp sumac, or dogwood, is common to the swamps, where it grows as a shrub to a height of fifteen feet. The seeds of this species yield an essential oil used in candle making. The Venetian sumac and elm-leafed sumac are species native to Europe, where they are utilized largely for tanning, dyeing yellow and black, and in medicine. Japan sumac is native to Japan. It yields a varnish of value for lacquer work. This varnish is made from the juice, which is secured by cutting a wound in the tree, and on

yellowish-green, usually growing in a cluster, and

sumac sold in the trade is obtained from Sicily. **SUMATRA** (sõo-mä'trå), an island in the Indian Ocean, lying southwest of the Malay peninsula, from which it is separated by the Straits of Malacca. Sunda Strait separates it from Java, and Banka Strait lies between it and the island of Banka. It is 1,112 miles long and is divided into nearly equal parts by the Equator. The width is 245 miles and the area is given at 184,768 square miles. The Barisan Mountains traverse near the western coast, their peaks ranging from 1,500 to 6,000 feet, but the elevations culminate in the volcano Indrapura, height 12,575 feet. Along the western coast is

exposure to the air it becomes thick and black.

A vegetable wax is obtained from the oil of the

seeds and is used for candles. Much of the

a plain only a few miles in width, which is covered with dense forests and has extensive jungles, while the eastern part of the island is a plain with fertile soil. This plain is traversed by numerous rivers, including the Jambi, Indragiri, Siak, Musi, and Bangka, all of which have a general course toward the east. The eastern shore has a number of important inlets, and off the eastern and western shores are numerous islands of more or less fertility.

In the interior of Sumatra the climate is hot and the presence of large marshes makes various fevers quite prevalent, but the coast and highland regions are generally healthful. Monsoons and earthquakes are not infrequent. Rains fall copiously in all months of the year. Among the minerals are limestone, granite, serpentine, basalt, sandstone, saltpeter, coal, copper, lead, iron ore, sulphur, silver, alum, and mineral oils. The flora is very extensive, including many kinds of valuable forest trees, fruits, flowers, grasses, shrubs, and berries. It has an abundance of wild animal life, especially the rhinoceros, leopard, elephant, tapir, antelope, tiger, bear, ant-eater, bat, deer, numerous monkeys, and many species of insects. Crocodiles and hippopotami abound in the rivers. Salmon and other fisheries are abundant. The domestic animals include horses, buffaloes, goats, swine, sheep, and poultry.

The natives of Sumatra belong to the Malay race and are largely Mohammedans. They are active, intelligent, tall, and quite industrious, but are extremely fond of opium. Polygamy prevails in many sections of the island. A modified system of castes is prevalent, largely for the reason that the Mohammedan faith is not wholly understood. It has an extensive trade with Holland and other European countries and with the United States. The exports include pepper, gold, sappan wood, cotton, precious stones, raw silk, tobacco, sulphur, coffee, camphor, and tropical fruits. Among the chief imports are drugs, rice, textiles, clothing, and utensils.

Marco Polo discovered Sumatra in the 13th century, but trade relations with the Europeans were not established until 1508. The Dutch founded settlements in 1601. They gradually developed various industries and established their seat of influence at Padang in 1666, and in 1881 acquired full control of the entire island. Since then it has been one of the most productive island possessions of Holland. It is divided into six districts, known as West Coast, East Coast, Benkulen, Palembang, Lampongs, and Acheen. The principal seaports include Acheen, or Achin, and Benkulen. Population, 1915, 4,029,505.

SUMBAWA (soom-ba'wa), an island of the East Indies, belonging to the Sunda group of islands, situated between Java and Flores. It is separated from Lombok by Atlas Strait. The length from east to west is 160 miles. It has

an area of 4,850 square miles. The surface is mountainous and volcanic. Tembora, on the northern coast, is an active volcano and has a height of 8,940 feet above the sea. Gold, rice, wood, fruits, and live stock are the principal products. The island is a possession of Holland. A large majority of the inhabitants are Malays who adhere to the Moslem faith. Population, 1915, 150,024.

SUMMER, the warm season of the year, following spring and preceding autumn. It begins with the summer solstice, about June 21, and ends with the autumnal equinox, about Sept. 22. In Canada and the United States summer comprises the months of June, July, and August, and in England it includes the months of May,

June, and July.

SUMMIT (sum'mit), a city of New Jersey, in Union County, 12 miles west of Newark, on the Delaware, Lackawanna and Western Railroad. It is the residence of many business men of Newark and New York. The chief buildings include the Arthur Home for Orphans, the public library, and several schools and churches. It has manufactures of silk textiles, clothing, and machinery. Electric lighting, waterworks, and sewerage are among the public utilities. Population, 1905, 5,673; in 1910, 7,500.

SUMNER (sum'ner), Charles, jurist and statesman, born in Boston, Mass., Jan. 6, 1811; died in Washington, D. C., March 11, 1874.



CHARLES SUMNER.

After graduating from Harvard University, in 1830, he studied law with Judge Story and was admitted to the bar in 1834. He made an extended tour of Europe from 1837 to 1840, and, after returning to America, entered the law

practice in Boston. On July 4, 1845, he delivered his celebrated oration, "The True Grandeur of Nations," which attracted much attention in America and Europe, and soon after that he became prominently connected with active politics. In 1851 the Democrats and Free Soilers united in electing him United States Senator to succeed Daniel Webster, which position he held continuously until his death. He speedily became the chief advocate of the antislavery movement. Among his noted speeches on that subject are those known as "Freedom National, Slavery Sectional" and "The Crime Against Kansas." The last mentioned caused Preston Brooks, a Senator from the South, to make a personal assault upon him, from which he re-

ceived injuries that prevented him from taking his seat until 1859. He was soon after reëlected Senator as a Republican, and as chairman of the Committee on Foreign Affairs was a valuable friend and adviser of President Lincoln. In April, 1865, he delivered the eulogy on Lincoln.

Sumner opposed President Johnson and the treaty with San Domingo, but favored the purchase of Alaska. His opposition to the San Domingo treaty, in 1871, lost him the support of President Grant and the Republican senators, as well as the chairmanship of the Committee on Foreign Relations. In 1872 he supported Gree-ley for President. His closing effort in public life was the introduction of a bill in the Senate having for its object the protection of the civil rights of colored citizens. Sumner was editor of the American Jurist shortly after graduating, lectured at Harvard, and edited three volumes of law decisions. His public addresses and orations were published in a complete form in fifteen volumes, having been edited partly by himself and partly by Longfellow, who was his literary executor. The public addresses of Sumner were first published under the title "Orations and Speeches" and later were added "Recent Speeches and Addresses.

SUMNER, Edwin Vose, soldier, born in Boston, Mass., Jan. 30, 1797; died March 21, 1863. He studied at Milton Academy and in 1819 became second lieutenant in the United States army. Until 1838 he served on the frontier, but in that year took charge of the school of cavalry at Carlisle, Pa. He served as major during the Mexican war, taking part at Cerro Gordo and Molino del Rey, and in 1851 became Governor of New Mexico. Subsequently he saw service against the Indians and in 1861 was assigned to the army of the Potomac, with which he served at Fair Oaks, Antietam, and Fredericksburg. In 1863 he was assigned to the department of Missouri, but died before assuming

duties in the West.

SUMPTUARY LAWS (sump'tu-a-ry), the name of statutes that aim to regulate private expenditures, such as extravagance in the purchase and use of clothing. Laws of this kind were deemed essential in ancient Greece and Rome, where legislation was directed with the view of avoiding extravagance in dress, entertainments, and even funerals. The purpose of such laws was not solely to prevent extravagance, but likewise to overcome crime, poverty, and immorality. Costly banquets and funerals were prohibited by the laws of Solon, and the early laws of Rome limited the expenditures and specified the number of guests that might be entertained at banquets. In England, during the reign of Edward III., the kinds of clothing that might be worn by certain classes were prescribed and not more than two courses were permitted at a meal. In the colonial times Massachusetts undertook to regulate the cost of funerals. At present the tendency of government is to guarantee personal liberty, leaving it to the individual as to the habits, occupation, food, drink, and clothing that he may see fit to adopt. However, legislation is directed toward the protection of public health and public safety. Prohibition of the liquor traffic is a form of

sumptuary legislation.

SUMTER (sum'ter), a city in South Carolina, capital of Sumter County, 43 miles east of Columbia, on the Southern and the Atlantic Coast Line railroads. The surrounding country is fertile, producing cereals, tobacco, vegetables, and fruits. It has a growing trade in cotton, live stock, and merchandise. The noteworthy buildings include the county courthouse, the high school, two academies, and a number of churches. Among the manufactures are cotton textiles, furniture, cigars, and earthenware. Electric lighting, sanitary sewerage, and waterworks are among the improvements. Population, 1900, 5,673; in 1910, 8,109.

SUMTER, Thomas, soldier, born in Virginia in 1734; died June 1, 1832. His early life was spent in South Carolina, where he took part in the Cherokee War. In 1776 he was made lieutenant colonel in the Continental army, serving in his State until the fall of Charleston, when he raised a large force in North Carolina, with which he defeated the British in 1780. The same year he gained a victory at Hanging Rock, but later was routed by Tarleton at Fishing Creek. Tarleton again defeated him at Blackstock Hill, where he was severely wounded, but he returned to the active service in 1781. He was elected to Congress in 1788 and at two succeeding elections, and became a member of the United States Senate in 1801 and again in 1811. From 1809 until 1811 he was United States minister to Brazil. He was the last surviving general officer of the Revolutionary War.

SUN, the central luminary of the solar system. It is the center of gravity and the main source of light and heat, and is regarded by astronomers as a star. The sun is important and magnificent above all other objects in the universe, and, obedient to the power of its attraction, all other bodies journey around it. Light and heat are scattered throughout space by its radiant energies, thus making the existence of every form of life activity either directly or indirectly dependent upon it. The transformation of solar energy is the basic cause of every variety of animate or inanimate motion upon the

earth.

The sun was worshiped in ancient times, when it was held in veneration as the lord of the day. It was thought for ages that this central luminary moves in a mysterious way while the earth is at rest, and, though astronomers sought to arrive at accurate theories regarding its influence on planetary bodies, it was left for the astronomer Copernicus (q. v.) to announce, in 1530, that the sun is the center of the solar system and around it move all other heavenly

bodies within the sphere of its influence. Since then much progress has been made in studying its influence and relation to other heavenly bodies, and spectrum analysis has aided in determining to a large extent its general constituents.

The mean distance of the sun from the earth is placed at 93,000,000 miles, the diameter at 866,500 miles, and the density at one-fourth that of the earth. Thus the surface is 12,000 and the volume 1,300,000 times that of the earth, but the mass is only 332,000 times as great. The entire mass of the sun is estimated at 750 times greater than that of all other bodies in the solar system, and the period of axial rotation is placed at 25.8 days, being estimated at that figure by the movement of sun spots. However, recent investigations have led to the view that the sun-spot belts have a peculiar surface drift. Until lately it was thought that the portion of the sun visible to the naked eye constitutes the whole luminary, but now it is believed that around that central sphere, technically called the *photosphere*, there are three or four concentric envelopes. These are three or four concentric envelopes. are known as the chromosphere, the inner being the corona and the upper, the atmosphere. Besides these there is probably an outer corona.

It is thought that the sun spots are cavities in the concentric envelopes and that they result from unequal velocities of neighboring portions of the solar atmosphere. The sun spots are called maculae, and the name faculae is applied to the brighter part of the sun surface, while the term mottlings is used to designate the parts ranging between the maculae and the faculae. The photosphere exhibits a network of polygonal and other figures when examined under the telescope. Among the figures are pores and domes, the former appearing to be downrushes of vapor, and the latter, luminous clouds. Astronomers assert that there is an immediate connection between the sun spots and rainfall, basing their conclusions upon observations of famines in India for the past thirty years. It is asserted that the absence of rainfall, from which famines result, uniformly occurred at periods when the temperature of the sun showed considerable variations from the normal, the famines following the lower temperatures.

Johann K. F. Zöllner (1834-1882), a German physicist and astronomer, expressed the view that the sun is in a liquid state and that the temperature is sufficiently high to melt a covering of ice equal to forty feet in thickness in a minute, but there is no certainty as to the exact temperature at the surface. Spectrum analysis has proven conclusively that the solar atmosphere contains the following substances: zinc, iron, copper, nickel, cobalt, manganese, titanium, chromium, calcium, solium, sulphur, barium, hydrogen, potassium, magnesium, aluminum, silver, and cerium. It has been observed that jets of hydrogen are thrown to a height of 175,-000 miles in twenty minutes and disappear in thirty minutes, while incandescent hydrogen clouds reach an altitude ranging from 20,000 to 80,000 miles. The amount of heat proceeding from every square foot of the sun's surface is thought to be equivalent to the mechanical effect of the action of 7,000 horse power, but no approximate estimates of the amount of light sent forth have been agreed upon. The heat of the sun raises vapor from the earth, thus producing rain and supplying necessary elements for the growth of plants and the sustenance of animals. Stored up in coal, it supplies us with fuel, and in many other ways provides essentials to life and industry. The powerful and enduring energy of the sun is supposed to be maintained by meteors falling into it and by a constant contraction of its volume,

SUNBIRD, the name of a bird found in the Eastern Hemisphere, chiefly in the warmer parts. Several species have been described, all of which are small and somewhat resemble the humming birds of America. They feed partly on the nectar of flowers, which they gather by their long bill while perching instead of fluttering in the air. A part of their food consists of insects, chiefly minute forms found within the flowers. The male has a bright plumage during the breeding season, but is somewhat dull at other times. A number of species build their nests in the limbs of trees, roofing them over with tips of the leaves.

seat of Northumberland County, at the confluence of the western and eastern branches of the Susquehanna River. It is situated 50 miles north of Harrisburg, on the Pennsylvania and the Philadelphia and Reading railroads, and has a growing trade in coal and merchandise. The surrounding region produces lumber, coal, cereals, and fruits. The notable buildings include the county courthouse, the Mary M. Packer Hospital, the public library, and many churches. Among the manufactures are flour, nails, carpets, furniture, cigars, clothing, and machinery. It has electric street railways, waterworks, and sanitary sewerage. It was settled in 1772 and incorporated in 1797. Population, 1910, 13,770.

SUNDA ISLANDS (sun'da), a chain of islands in the Malay Archipelago, situated between the China Sea and the Indian Ocean. They are divided into the two groups known as the Lesser Sunda and the Greater Sunda islands. The former includes Bali, Flores, Lombok, Ombai, Sumbawa, and a number of others, while the latter embraces Banca, Borneo, Celebes, Java, Madura, and Sumatra. These islands are so named from the Sundanese, a race of Malayans, who somewhat resemble the Japanese. All the islands, except a part of Borneo, belong to the Netherlands.

SUN DANCE, an annual religious ceremony practiced by many tribes of the American Indians, as a thanksgiving to the sun god. Formerly the ceremony was accompanied by extreme fasting and tortures, but they are no longer per-

mitted, although the sun dance still survives among the Sioux, Cheyenne, and other tribes. The management is in charge of certain priests and warriors and the ceremonies continue about a week, but the dance proper is conducted only about four days and nights. A period of fasting usually precedes the dance, and those who take an active part are partly stripped and painted. The dancers take their position in a half circle about a pole at the center, at the top of which is a sacred object, and they constantly look upward so as to face the sun. Between the teeth is a whistle fitted to produce a shrill sound, and the songs of the sun dance are chanted to the beating of a powerful drum. Within the lodge of the medicine man is the sacred pipe and other ceremonial objects. The dance is interspersed with feasting, addresses, and the initiation of new members into the societies.

SUNDAY, the first day of the week, kept as the sabbath among most Christians in remembrance of the resurrection of Christ. Laws for the observance of Sunday were enacted as soon as the Christian religion was recognized, and Constantine, in 321, prohibited all business on that day, except necessary agricultural labor and the manumission of slaves.

SUNDAY, William Ashley, evangelist, born at Ames, Iowa, Nov. 19, 1863. He studied in the high school and at Northwestern University, was a professional ball player from 1883 until 1890, and was assistant secretary of the Chicago Y. M. C. A. from 1891 until 1895. In the meantime he was ordained as Presbyterian minister, but devoted his time almost exclusively to evangelistic work, in which he gained a very wide acquaintance and attained much influence for prohibition and Christian endeavor.

SUNDAY SCHOOLS, the organizations maintained for the purpose of giving instruction in religion to the young. They are held either on Sunday or on the Sabbath. The Protestant denominations commonly have their Sundayschool meeting immediately preceding or following regular services on Sunday, but the denominations that keep Saturday as the day for regular worship hold them on Saturday, and usually denominate them Sabbath schools. The patriarchs of ancient times conducted family instruction for the children, and with the early rise of Christianity religious teachings were given alike to old and young. Instruction of the young in religious matters was greatly neglected in the Middle Ages, but with the beginning of the Reformation it became apparent that the preservation of Christian practices is quite impossible without some systematic organization that will, direct religious conduct and tenets.

Martin Luther was the first Protestant leader to organize Sunday schools, and those instituted by him and his fellow-reformers resulted in a general awakening of religious thought. Entire schools were frequently made up of adults, who attended them with devoted eagerness to read

and study the Bible, and at that time many of the schools for children necessarily taught the rudiments of reading before religious instruction could be comprehended. Sunday schools were first organized in England by Robert Raikes, publisher of the Gloucester Journal, who, in 1781, formed several local organizations in the poorer districts of his city, largely with the view of overcoming widespread profanation of the Sabbath. These children were employed during the week in factories, and on the Sabbath spent their time in idleness and play. Hence, the Sabbath school became a source of great blessing to them and the community. Teachers were at first employed for twenty-five cents a day and the children were kept in the Sunday school the entire day, except the brief period they attended church services.

The popularity and value of these organizations spread rapidly and brought forward many volunteer teachers, a plan that is at present in vogue in all Sunday schools. In 1784 Raikes published an article in the Gentleman's Magazine, in which he minutely described the organization and objects of Sabbath schools, thus calling general attention to these institutions. Rowland Hill in the same year established the first Sunday school in London, and by 1789 about 300,000 Sunday school members were enumerated in Great Britain. The Philadelphia Society for the Support of Sunday Schools was organized in 1786 with the view of effecting organizations whereby children could be gathered into Sunday training classes. Schools were soon started in Boston, New York, and other cities. The New York Sunday-School Union was organized in 1816, and the American Sunday-School Union in 1824. At present all the Protestant evangelical churches have Sunday-school organizations. The nonevangelical and Roman Catholic churches give religious instruction to the young either in Sunday schools or in parochial schools maintained largely for the same purpose. In many communities both classes of schools are maintained. The latest figures place the Sunday schools in the United States at 140,680, with 1,503,640 teachers and 11,682,832 pupils. In 1908 Canada had 10,890 Sunday schools, with 86,640 teachers and 702,680 pupils. The Sunday schools of the world are estimated at 268,840, with 2,875,550 teachers and 26,545,780 scholars.

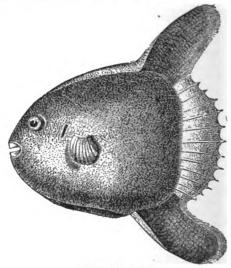
SUNDERLAND (sun'der-land), a seaport city of England, in Durham County, thirteen miles northeast of Durham. It occupies a convenient site at the mouth of the Wear River, has extensive railroad facilities, and has a commodious and safe harbor. Sunderland has a large export trade in coal and imports of grain, timber, and raw material for manufacturing purposes. Shipbuilding is an extensive industry. Among the manufactures are cordage, ironware, sailing vessels, anchors, earthenware, glass, engines, and machinery. The city contains

a number of excellent public buildings, among them an orphan asylum, an infirmary, numerous hospitals, and excellent educational and scientific institutions. It has a fine public library and several parks, the latter including People's Park, with a monument built in honor of Havelock. Several bridges across the Wear River connect the two parts of the city, each of which has extensive docks and fishing stations of considerable extent. The region surrounding Sunderland is one of the most productive coal districts of England. The surface is fertile, producing fruits, grasses, vegetables, and cereals. Two stone piers with lighthouses are situated at the entrance of the harbor. The city dates from the early part of the 14th century, but its commercial importance commenced with the last century, when the Durham coal trade began to develop. Population, 1911, 151,162.

SUNDEW, a genus of plants native to America, found chiefly in bogs and marshes. The common sundew has rounded leaves that spring from the root, forming a rosette, and in the center is a tall stem with a raceme of flowers on one side of the upper part. The leaves are fringed and covered with hairs, which secrete a sticky fluid. When small insects come in contact with the hairs, they are caught and held firmly by the enfolding hairs, and are digested through the action of the secretion.

SUNDIAL. See Dial.

SUNFISH, a genus of marine fishes of the family *Diodontidae*. They are so called from the compressed form of the body and because



SHORT SUNFISH.

of their habit of coming to the surface when the sun shines. The body is short and of a circular form, terminating in a short and abrupt tail. They have two large fins, a dorsal and an anal, by which they move through the water in a vertical position. In some instances they effect movement by rolling the body over and over. Only two species are known, the short sunfish and the oblong. The short sunfish is quite round when young, but its body gradually assumes a compressed form and attains a length of three to seven feet. The oblong sunfish is somewhat larger, its body attaining a diameter of from eight to twelve feet. These species occur in all the seas. The sunfishes have a leathery skin and soft, white flesh. An oil useful in medicine is secured from the liver. Sunfishes have no swimming bladder or teeth, cutting edges of bone serving instead of the lat-The name is sometimes applied to several species of small, flat fishes common to streams and lakes.

SUNFLOWER (sun'flou-er), a genus of plants of the aster family, which have large, cordate leaves and terminal, flat, circular heads



SUNFLOWER.

A, Single floret; B, Seed.

of flowers. They are herbaceous plants. About fifty species have been described, all of which are native to America. The stems of some species attain a height of six to fifteen feet, and the larger heads have a diameter of twelve inches. The size of the flowers depends on

pruning off a number of the buds, usually two or three being sufficient to develop the largest form. Sunflowers are cultivated in many sections of Canada and the United States for ornamental plants and for their seed, which is valuable for cage birds and domestic animals. They are grown in fields in Southern Europe. where the flowers yield excellent food for bees and the seeds are used to feed cattle and poultry. Both annual and perennial species are grown and all bear yellow flowers. Fertile and well cultivated land yields from 30 to 48 bushels of seed to the acre. The seed contains 16 per cent. of protein and 21 per cent. of fat. These plants are so named from the ideal resemblance of the large flowers to the golden rays of the sun, with which they were formerly believed to move as that luminary passes through the

SUNNITES (sun'nits), the orthodox sect of Moslems, so called from their adherence to the Sunna, or tradition of prophetic laws. are distinguished in this respect from the Shiites, or heterodox Mohammedans. Sunna embraces three distinct departments, including the remarks and counsels of Mohammed, his deeds and practices, and his silence upon certain usages. The last mentioned is looked upon by the Sunnites as an indication that the Prophet made manifest his opinion by abstaining from doing or saying certain things, hence his silence holds an important place in the doctrines of this sect. The Sunnites are the largest branch of Mohammedanism and have their following chiefly in Persia, Asia, Turkey, and Syria. They are subdivided into four sects known as Hanifites, Hanbalites, Malikites, and Schiites.

SUNSTROKE (sŭn'strok), a very dangerous affection of the nervous system, caused by exposure to the direct rays of the sun, especially in the tropics and in the hottest part of the year in the Temperate zones. It is especially frequent and dangerous among overworked and badly fed soldiers under exposure to heat, and is quite common in the large cities and in harvest fields. The early symptoms resemble those attending simple apoplexy, commencing with faintness, abnormal heat, thirst, dryness of the skin, and prostration. Later the action of the heart becomes violent and the temperature may rise to 115° Fahr., which is sometimes followed by vomiting, and finally coma results. It has been found that from 40 to 50 per cent. of those attacked by sunstroke die, and that those recovering are quite generally impaired in bodily health or mental vigor.

SUN WORSHIP, a form of nature worship which dates from remote antiquity. It was practiced throughout the period of human history to a considerable extent among peoples somewhat higher in the scale of civilization than the nomadic tribes. In this form of religious worship the sun and moon are regarded as com-

panions, sometimes as brother and sister or husband and wife, and they are held to be the rulers of the earth. It was the chief worship among the Aryan tribes, from whom it descended to certain classes of Brahmans, and is still practiced in some parts of India. The ancient Persians connected their god Mithra with the sun, as also did the Greeks their Helios and the Egyptians their Ra. The Spanish conquerors of Mexico found a people who maintained splendid temples dedicated to the sun, among whom the priests of the sun were the predominating influence. Sun worship flourished in Peru and to some extent among the Indians of North Ameria. The Peruvians held the sun to be the ancestor and founder of the dynasty of the Incas, who made sun worship the state religion and reigned as the representative of the sun god.

SUPERIOR, a city in Wisconsin, capital of Douglas County, on Lake Superior, seven miles south of Duluth, Minn. Communication is furnished by the Northern Pacific, the Chicago and Northwestern, the Great Northern, the Duluth, South Shore and Atlantic, and other railroads. It occupies a fine site at the mouth of the Saint Louis River, on three bays or inlets of Lake Superior, and has a well-sheltered harbor. Bridges, ferries, and electric street railways connect it with Duluth. The streets are regularly paved and improved by sewerage, pavements, waterworks, and gas and electric lighting. It has manufactures of lumber, brick, ironware, furniture, machinery, and farming implements. The trade in coal, lumber, wheat, and merchandise is very extensive, the city having abundant facilities to handle large quantities of these commodities. It has large flouring mills, wharves, and shipyards.

Superior has many large and substantial buildings, the construction being chiefly of brick and stone. They include the county courthouse, the public library, the two high schools, the Saint Mary's Hospital, the business college, and many business blocks and churches. It is the seat of a State normal school. The vicinity was visited by Du L'Hut in 1680, when he established a trading post here, but it was not platted until 1855. In 1881 the Northern Pacific Railway was built to this place and four years later it became a city. Population, 1910, 40,384.

SUPERIOR, Lake, the most westerly of the Great Lakes of North America, the largest body of fresh water in the world. It is bounded on the south by Michigan and Wisconsin, and its other boundaries are formed by Minnesota and Ontario. The length from east to west is 415 miles; greatest breadth, 165 miles; and the area, 31,200 square miles. It has fully 1,760 miles of coast line, the principal inlets in the United States being White Fish, Keweenaw, and Chaquamegon bays. The lake surface is 602 feet above sea level. The mean depth is given at 480 feet and the greatest depth at 1,010 feet.

Lake Superior receives the drainage of an area equal to only 85,000 square miles, this being due to its location near the watershed between the Mississippi River and Hudson Bay. Many small streams flow into it, the most important being the Saint Louis, Pigeon, Nipigon, Flag, Union, and Fire Steel rivers. Within it are many islands and island groups, including the Apostle Islands, Isle Royale, Manitou, and Grand, under United States jurisdiction, and Caribou and Michipicoten under that of Canada. Keweenaw Point is the most important projection into the lake. It comprises the County of Keweenaw and a part of Houghton, in the State of Michigan.

SURABAYA

The southern shore is generally low and sandy, but has a number of remarkable cliffs, among them Pictured Rocks, 300 feet high. The northern shore is formed quite largely of cliffs ranging from 200 to 1,500 feet above the lake. A line drawn from Saint Mary's River to a point north of Isle Royale, and thence to the mouth of the Pigeon River, constitutes the boundary between the United States and Canada. Lake Superior is remarkable for its clear water. It has valuable sturgeon, trout, whitefish, and other fisheries. Copper and iron deposits of vast value abound on its shores and many of the islands, especially in the vicinity of Duluth, Superior, Houghton, and Port Arthur. It is important as a route of trade and travel in the summer season, particularly in transporting grain, live stock, lumber, coal, copper, iron, fish, and manufactures. The Saint Mary's River, at the southeast end, is the only outlet, connecting it with Lake Huron.

SUPERNATURALISM (sū-pēr-nāt'û-raliz'm), the doctrine of a divine agent in revealing to mankind a knowledge of God, in the grace which renews and sanctifies men. It stands in opposition to the doctrine that physical or natural causes are the agencies which thus influence. The term rationalism stands in contradistinction to supernaturalism. It maintains that reason must be exercised in judging religion. According to supernaturalism, the miracles and revelations recorded in the Bible were wrought by a divine and supernatural influence. See Miracle.

SUPREME COURT. See Courts. SURABAYA (soo-ra-ba'ya), or Soerabaya, a city of Java, on the Strait of Madura, near the mouth of the Romo River. It is the largest Javanese city. The surrounding country is fertile, producing fruits, sugar cane, cereals, and spices. The manufactures include tobacco and cigars, furniture, clothing, sugar, rum, and textiles. It is the seat of a mint, an arsenal, a cannon foundry, and several government buildings. A number of the streets are paved and they are generally lighted with electricity. Waterworks and a sewerage system have been established. The city has a large trade with Holland, to which country it belongs. Population, 1917, 147,822.

SURAKARTA (soo-rà-kar'tà), or Soera-karta, a city of Java, capital of a government of the same name, situated about fifty miles south of the city of Samarang. It occupies a fine site on the Solo River and is the seat of many beautiful palaces and temples. The government of the Netherlands maintains several schools in the European part of the city, including a normal school for training Javanese teachers and a military academy. The city has a number of hospitals, a citadel, and numerous churches. A railroad line extends from the city to Samarang, thus facilitating the transportation of produce to the coast. Population, 1917, 100.695.

SURAT (soo-rät'), a city of India, in the Bombay presidency, on the Tapti River, 150 miles north of Bombay. It is surrounded by a rude wall of brick, has ample railroad facilities, and produces clothing, cotton and woolen goods, toys, earthenware, cigars, and machinery. Surat has a large trade in cereals, cotton, live stock, and merchandise, much of which is export trade. Among the principal buildings are those maintained by the British government, several Hindu temples and Mohammedan mosques, an old citadel, and a number of schools, hospitals, and churches. Surat was a fishing village in the 13th century, but soon after rose to prominence as the place from which the Mohammedans embarked for their pilgrimages to Mecca. The Portuguese came in possession of it in 1512 and it was afterward held by the Dutch and French, but in 1800 was annexed to the English possessions. Though of considerable military and commercial importance, it is not as enterprising as it was at the beginning of the last century, when it had a population of three-quarters of a million. Population, 1908, 120,063.

SURGERY (sûr'jer-y), the branch of the medical practice that relates to external injuries, deformities, and other morbid conditions to be treated directly by manual operations or by the application of instruments. It was practiced with success among the Egyptians about 410 B. C. Surgical instruments for reducing dislocations of the bones are mentioned by Hippocrates, the celebrated Greek physician and writer of six surgical treatises, in the early part of the 4th century B. C. Grecian surgeons were the most skilled of the ancient practitioners, and by them surgery was introduced in Rome. Considerable progress in surgery was made in the prosperous period of Arabia. Andrew Vesalius (1514-1564), a native of Basel, Switzerland, is considered the founder of modern surgery, owing largely to his successful practice and an excellent treatise published by him in 1543.

The more correct views of the circulation of the blood published by Harvey, in 1616, and his lectures on surgery, aided greatly in developing the practice. The invention of improved surgical instruments by Fabricius, of Hilden, Germany, gave practitioners valuable assistance in treating complicated organs, such as the urethra and the ear. Others eminent in the surgical practice include John Hunter, Ambrose Pare, Pasteur, and Von Gräfe. A multiplicity of instruments is employed in modern surgery. Among the most recent additions of value to the practice are skin grafting, nerve stretching, successful excision of cancerous affections, radical cure for hernia, and the invention of instruments and the discovery of medicines rendering operations less painful and much more effectual. The discovery of the Röentgen, or X-Ray, and radium, have added materially to the efficiency of surgical practice. See Anaesthetics; Antiseptic; Bacteriology; Medicine; X-Ray.

SURINAM (soo-ri-nām'), a river of South America, in Dutch Guiana. It rises in the mountains of the south central part, has a general course toward the north, and discharges into the Atlantic 16 miles below Paramaribo. The entire length is 380 miles. It is navigable for the largest vessels about 40 miles and for ships drawing ten feet for about 100 miles. Valuable forests abound in the valley of the Surinam. Farming is carried on extensively between Paramaribo and the ocean. The Cottica River, a navigable channel, joins the Surinam near its mouth.

SURMULLET (sûr-mul'let), the name of a species of mullet found in the tropical seas. It is a common fish in the Mediterranean, where it obtains a weight of from six to ten pounds. The flesh is highly esteemed for food and was prized as an article of commerce by the ancient Romans.

SURREY (sŭr'rĭ), a light vehicle with four wheels, usually provided with two seats and drawn by one or two horses. The body is box-shaped and is built somewhat like that of a phaëton.

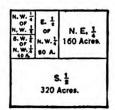
SURREY, Henry Howard, Earl of, soldier and poet, born in Suffolk, England, in 1517; executed Jan. 21, 1547. He was the eldest son of Thomas Howard, third Duke of Norfolk, and in 1532 accompanied Henry VIII. to France, where he spent some time in study. In 1544 he was made a commander of the English army in France. He was wounded at the siege of Montreuil, and in the following year was superseded by the Earl of Hertford. Subsequently he made an extended tour of Italy, where he became passionately fond of poetry, and on returning to England spent much time in writing sonnets after those of Italian authors. Surrey and his father were suspected of designing to acquire the throne of England even before the death of Henry VIII., and he was arrested and imprisoned at the Tower on a charge of high treason. Defense was in vain before the partial court, and he was accordingly condemned and beheaded. Surrey was among the first to write in the form of polished blank verse, a style

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that so strikingly distinguishes the language of Shakespeare and Chaucer, and to him we owe the introduction of the sonnet. It is to the new metrical form and style in which his poetry was written, rather than to the poetry itself, that his writings are counted of literary importance.

SURVEYING (sûr-vā'īng), the science of determining the area and configuration of portions of the surface of the earth and representing them on maps. It is a branch of applied mathematics and includes land surveying and marine surveying. Land surveying is the art of applying the principles of geometry and trigonometry to the measurement of land, either on a small or a large scale. Marine surveying has reference to the measurement of shoals, coasts, and harbors, including a complete determination of the contour of the bottom of a

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SUBDIVISIONS OF THE TOWNSHIP.

harbor or other bodies of water. In plane surveying the surface is looked upon as a plane; this form is used in measuring small areas. Geodesic surveying is employed to determine the latitude and longitude of places and the relative length of terrestrial arcs in different latitudes. This art or science is called geodesy. Topographical surveying involves all the operations incident to finding the contour of a portion of the earth's surface, such as hills, valleys, water courses, and embankments, and the various methods of representing them upon a plane surface. Hydrographical surveying is the term employed to designate the surveys which locate inlets, shore lines of harbors, and other matters incident to coast lines. A reconnoissance survey is one hastily made for military and other purposes. Railroad surveying embraces surveys intended to ascertain the best line of communication between two given points. Mining surveying relates to the determination of the situation and position of the shafts, galleries, and other underground excavations of a mine already built, or surveys for the construction of mines not yet opened. The principal operations in surveying land include laying down base lines and driving triangles on either side of the base. Among the instruments used are the Gunter's chain, for measuring the linear dimensions to ascertain the area of a given tract of land; the theodolite, for determining the accuracy of angles; the surveyor's cross, for raising perpendiculars; and instruments known

as the transit, plane table, zenith sector, azimuth, etc.

When the early settlements of America were founded, the claims to land were governed largely by streams, hills, and other natural demarkations, thus making the individual possessions quite irregular in outline. Soon after the establishment of the nation under the Constitution, and before it had acquired new territory, a general system of surveys for all public lands was devised. Accordingly all land owned and offered for sale by the general government was laid out in townships, each six miles square, as nearly as the spherical form of the earth's surface would permit.

In surveying a tract of country the government, both in Canada and the United States, first establishes a line in a north-south direction, called the principal meridian, and then a line crossing it at right angles, parallel to the Equator, called the base line. Lines six miles apart are next run in both directions, those parallel to the principal meridian forming the range and those parallel to the base line the township, each being numbered consecutively from the point of beginning. A tract six miles square is called a township and consists of 36 sections. Each section is one mile square, thus containing 640 acres. The sections are numbered from 1 to 36, beginning at the northeast corner, as shown in the diagram. In describing land it is customary to give the fractional parts of a section, as the south half, the east half of the northwest quarter, the southwest quarter of the northwest quarter, etc. Interference in regularity by the curvature of the earth's surface and the contour of the region surveyed requires correction lines at the north and west sides of each township, where the sections are usually fractional, while all others are intended to include the exact number of acres in a section of regular size. Sections 16 and 36 were set apart for school purposes.

SUSA (soo'sa), an ancient city of Persia, which was situated on a plain near the Karun River, a stream flowing into the Persian Gulf. It is mentioned as Shushan in the books of Daniel and Esther, and is thought to have occupied a large tract near the modern village of Sus. Tracings of its name and plan have been discovered on Assyrian monuments dating from the reign of Assur-bani-pal, about 600 B. C., when it formed a part of Babylonia, but later it came under the Persian rule of Cyrus. Subsequently it became the capital of Persia and was the seat of great riches. When Alexander the Great conquered it, in 325 B. c., he obtained vast treasures of gold, silver, and precious stones from its palaces and citadels, and in 315 B. C. it fell under the control of Antigonus. It was so completely destroyed soon after by the Arabs that even its site was forgotten. Recent excavations have led to a discovery of the lost city. Among its extensive ruins are traces of the palace described in Esther. In several places on its former site are remains of monuments bear-

ing numerous cuneiform inscriptions.

SUSQUEHANNA RIVER (sus-kwe-han'nà), an important stream of Pennsylvania, which is formed in Northumberland County by the union of its eastern and western branches. The eastern branch rises in Otsego Lake, in southeastern New York, and is 250 miles long; while the western branch has its source in the Allegheny Mountains of Pennsylvania, and has a length of 200 miles. The main stream of the Susquehanna has a course of 150 miles, extending from the union near Northumberland in a southwesterly direction until it is joined by the Juniata, when it assumes a southeasterly course and flows into Chesapeake Bay. The branches afford fine water power and both they and the main stream have valuable fisheries. The Susquehanna is a wide and shallow stream and is navigable only during high water in the spring, when large rafts of logs are floated down the current. Among the cities on its banks are Harrisburg and Wilkesbarre, in Pennsylvania, and Oswego and Binghamton, in New York.

SUTLEJ (sŭt'lēj), a river of northwestern India, one of the five great rivers in the Punjab. It rises in an elevated lake of Tibet and flows through the Himalayas, where the sides of its narrow gorge attain a height of several thousand feet. The general course is toward the southwest, entering the Indus River at Mithankot. It is known as the Ghara River below the confluence with the Beas. The entire

course is 875 miles.

SUTTEE (sŭt-te'), a form of funeral sacrifice formerly practiced among certain castes of India, but now prohibited by statutory law. The sacrifice consisted of the widow being burnt with her dead husband on the funeral pyre, but, if he died at a distance, the widow was sacrificed on a pyre erected for that purpose. Evidences have been collected to prove that suttee was enforced as early as the invasion of Asia by Alexander the Great, and that the practice originated from a mistaken notion of the Vedas and other Hindu books. Many of the widows met the obligation with cheerful alacrity, but others were driven to it by fear of disgrace or priestly threats, and in some cases by sheer violence. It was instituted as a religious rite from the notion that great men should be accompanied into the other world by their wives, weapons, horses, and favorite jewels, either by having them burned or buried along with the deceased. In the period between 1813 and 1828 the suttees in Calcutta alone numbered annually from 300 to 600. When the question of prohibiting it was under discussion, the Brahmans quoted the Vedas in favor of the practice, but several European scholars had shown conclusively that the text had been misunderstood and falsified. The practice was prohibited by law in British India on Dec. 4, 1829, but it is still secretly consummated in some of the principalities by the natives of certain castes and descendants of ancient families.

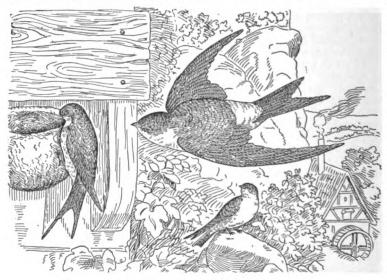
SUVAROFF (soo-va'rôf), or Suvoroff, Alexi Vassilievitch, soldier, born in Moscow, Russia, Nov. 24, 1729; died May 18, 1800. He descended from Swedish parents and entered the army of Finland. For several years he served in the Seven Years' War, taking part in the Battle of Kunersdorf in 1759, and took part in the Polish War of 1768 to 1772. In the war against the Turks, from 1773 to 1774, he won several battles and was commander in chief in the second Turkish War, beginning in 1787. He captured the fortress of Ismail in 1790, where a large number of Turks were slain. Joseph II. of Austria created him a count of the empire for his victory at Rymnik, in 1789, which saved the Austrians under the Prince of Saxe-Coburg from capture. In 1794 he operated in Poland, where he defeated a native army under Kosciuszko and occupied Warsaw. He defeated an allied army of French and Italians at Cassano in 1799 and marched to Switzerland with the hope of joining Korsakoff, who was defeated by Masséna at Zurich. This compelled him to retreat, and he was recalled and made commander in chief of the Russian armies. title of Prince Italiski was bestowed upon him.

SWABIA (swā'bi-a), or Suabia, in German Schwaben, an ancient duchy of southwestern Germany, so called from the Germanic Suevi, a class of people who occupied it in the 5th century. It had been called Alemannia previous to that time, from the Alemanni, its inhabitants before the Swabian invasion, who had driven out the Celts in the 1st century B. C. Swabia included about 13,000 square miles in the 5th century, when the Swabians and Alemanni were united under Swabian dukes. In 1080 the region became a possession of Count Frederick of Hohenstaufen, who made it the nucleus of Germany, and for centuries it was the most powerful and progressive of the German possessions. After the extinction of the Swabian line, the country became involved in prolonged wars, and from 1512 until 1806 it formed one of the ten circles into which Germany was divided. The most disastrous wars were the Peasants' War of 1525 and the Thirty Years' War from 1618 to 1648. The duchy is now divided among Hohenzollern, Baden, Bavaria, Württemberg, and Lichtenstein, though Württemberg possesses the larger part. A division of Baden called Swabia has an area of 3,732 square miles. seat of government is at Augsburg.

SWALLOW (swŏl'lô), an extensive genus of birds found in all parts of the world. They are distinguished by a short, depressed bill with a wide gape, long, pointed wings, the tail more or less forked, and weak feet. Swallows are birds of powerful flight and spend more time on the wing than other birds. It is not unusual to see them soaring high in the air, describing

great circles, usually flying singly and uttering shrill screams. They feed chiefly on insects, which they catch while flying, and some species even scoop water from the surface of ponds and streams while on the wing. The nests are built of straw and feathers, usually under the eaves of buildings and on rocks, and some species find a home in small houses built for that purpose.

The common swallow is native to Europe, Asia, and Africa. It attains a length of about



SWALLOWS AND NEST.

nine inches and has a steel-blue color on the back and wings, with reddish markings be-It is frequently called chimney swallow from its habit of building nests near the chimneys of houses, where it lays its eggs and rears the young. Two broods are produced in a year. This species migrates to the warmer parts in the winter, and its return to Western Europe is a harbinger of spring. The song is a mere twitter, which is heard most frequently as the birds gather in large flocks in autumn The sand martin is a species to migrate. widely distributed in America and Europe. It has brownish plumage and is found largely along sandy banks of rivers and in sandpits, where it excavates galleries for nesting purposes. These galleries are often three to five feet long, more or less tortuous, and are excavated with the bill. The purple swallow is widely distributed in America and is so named from its purple-bluish color. Other species include the cliff swallow of North America, the fairy martin of Australia, and the window swallow of Europe. Swallows, like owls, eject the undigested portions of their food in small pellets or castings. They closely resemble the swifts, which are often mistaken for swallows, and also the sea-swallow, or tern. The fairy

martin of Australia is a small species, and, like the allied species of China and the East Indies, builds flask-shaped nests that are gathered and sold in the market as edible and highly favorite food. This food is dissolved in water and used in preparing gravy and soup.

SWAMP. See Marsh; United States, subhead AGRICULTURE.

SWAMPSCOTT (swomp'skot), a town of Massachusetts, in Essex County, twelve miles northeast of Boston. It is on the Boston and

Maine Railway and is finely situated near the shore of Massachusetts Bay, hence is popular as a watering place. The chief buildings include the public library, the townhall, the Phillips School, and many fine hotels and summer residences. It has electric lighting, sewerage, and waterworks. Fishing is carried on extensively in the vicinity. Population, 1910, 6,204.

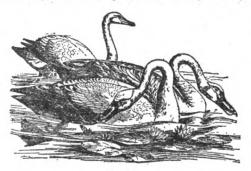
SWAN, a genus of web-footed birds of the duck family. They are among the largest and most beautiful of aquatic birds. Naturalists recognize a number of well-marked species, more or less widely distributed,

and they are migratory in a wild state. The neck is long and arched and when swimming it is bent in an S-shaped curve. Swans have a hiss resembling that of geese, which is heard chiefly when the bird is disturbed. They defend themselves by striking blows with the wings. Young swans are called cygnets and have a bluish-gray color, with a dark-hued bill. When full grown, the common swan measures about five feet and weighs fully thirty pounds. The feathers are a pure white, and it takes great pride in washing and keeping them clean. This species is native to the northern and western parts of Europe, whence it moves in the fall toward the tropical regions. It has been domesticated as an ornamental bird for gardens and parks, for which purpose it is kept extensively in America and all the European countries.

The American swam breeds in the northern part of North America, usually laying ten to twelve eggs in the rushes near the water, and in the fall moves southward to the Carolinas. While its appearance is much like that of the common swan, it is somewhat smaller. It is remarkable that all the species of swans native to the Northern Hemisphere are white, while those of the Southern Hemisphere are black or have black markings. The South American

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black-necked swan is white, but has a black neck and a bright red knob at the top of the bill. It has been domesticated and is reared as a park or barnyard ornament. The black swan of Australia is black with white markings and has a reddish bill. It is usually seen in flocks of eight or ten. It has been tamed and is grown to some extent. An American species called the trumpeting swan is noted for its musical cry and is singular for having a large



SWANS.

cavity in the breastbone in which the windpipe coils before passing to the lungs. Swans were formerly eaten to a considerable extent, but are now reared only on a limited scale for ornament and their feathers. The female lays from five to ten eggs, which are hatched in six weeks. It was once erroneously supposed that the swan sings a song just before dying, called the song of the dying swan.

SWANSEA (swon'se), a seaport city of Wales, in the County of Glamorgan, at the mouth of the Tawe River, 43 miles northwest of Cardiff. The harbor in Swansea Bay, an inlet from Bristol Channel, is well improved by wharves and masonry. It has communica-tion by steam and electric railways. The surrounding country is noted for its extensive deposit of coal, thus making it a favorite point for smelting ores brought from the mines of England. It has extensive manufactures of cordage, pottery, leather, ironware, tin, tar, sailing vessels, chinaware, and spirituous liquors. Swansea has an extensive export and import trade, fully 2,500 vessels entering the port annually. Among the leading buildings are the customhouse, numerous hospitals, and several fine educational and religious institutions. Anciently it had a fine castle, but this structure was dismantled in 1647. Population, 1911, 114, 673.

SWEAT, or Perspiration, the fluid which is exuded through the pores of the skin. glands that secrete sweat are made of tubes that are twisted in the form of a knot, leading to a surface by a somewhat spiral duct. At the surface of the skin these ducts terminate in openings called pores. The sweat consists of water with numerous solids in solution, is saltish to the taste, and serves to expel certain waste materials which collect in the blood. The effect of sweating is both to cool and cleanse the body. It is estimated that from one to four pounds of this fluid pass away from the skin in 24 hours. The portion which is evaporated as fast as it is carried to the surface of the skin is called insensible perspiration and that which accumulates on the skin is termed sensible perspiration. In some diseases, as in rheumatism and tuberculosis, the sweating is profuse, while in some fevers it is greatly diminished. The former condition is called hyperidrosis, while the latter is termed anidrosis.

SWEATSHOP SYSTEM, the name applied in certain classes of manufacturing, especially those in which the work is done in the homes or in small workshops at very low wages. Factory labor is not subject to it, since it is more highly skilled and adapted to the use of modern methods and machinery. In most cases it embraces the older methods of doing the work in small shops, a survival of ancient methods, in which the workers are in competition with the newer systems. Sometimes the laborer is employed and contracted to a subcontractor, or sweater, who makes a small margin of profit between the wages paid to the workers and the contract prices established as a standard. It has been more common in the manufacture of clothing and cigars than in any other lines. Legislation has been directed against this system in many countries, with the view of prohibiting the employment of children and improving the sanitary conditions of the smaller and overcrowded workshops. Trades unions and the establishment of larger corporations have done much to relieve the unfavorable conditions formerly very harmful to the health of

SWEDEN (swe'den), called Sverige in Swedish, a kingdom of Northern Europe, occupying the eastern part of the Scandinavian Peninsula. It is bounded on the west and north by Norway, east by Russia, the Gulf of Bothnia, and the Baltic Sea, and south by the Baltic Sea, the Cattegat, and the Sound. The length from north to south is 965 miles, the breadth is from 150 to 225 miles, and the area is 172.878 square miles. It is formed of three principal divisions, which are Norrland in the north, Svealand in the center, and Gotland in the south. The coast line of 1,375 miles is deeply indented by gulfs and the mouths of rivers. To Sweden belong many islands of the Baltic Sea, including Oland and Gotland, and the Aland Archipelago.

Description. Sweden is separated from Norway by the Kiolen Mountains, or Scandinavian Alps, but these highlands are chiefly in Norway, where they are more rugged and precipitous in character. In Sweden they form a plateau about 4,000 feet high, from which occasional peaks rise to a greater altitude. From the boundary these highlands slope gradually toward the east and decline into hills of moderate elevation to the seashore. Sarjektjakko, 6,850 feet, and Kaskasatjakko, 6,810 feet, are the highest summits. The greatest elevations are in the northwest, where Kebnekaisse attains a height of 7,004 feet. In the southern part the country is very level. Here the great plain of Scania, the most fertile tract of the peninsula, covers considerable territory. The northern part is bleak and rocky and barren and snowclad hills give

the country a grand aspect.

The drainage is chiefly toward the east and south into the Gulf of Bothnia and the Baltic. While the rivers afford much water power, they are too rapid for extensive navigation. The Tornea and its largest northern tributary, the Lainio, form the boundary with Russia. Among the rivers that flow into the Gulf of Bothnia, passing in their order southward, are the Kalix, the Lulea, the Pitea, the Skelleftea, the Gidea, and the Indals. The Dal Elf is the largest river that discharges into the Baltic. Lake Wener, which receives the Klar Elf, discharges through the Gota Elf into the Cattegat. The beds and banks of the rivers are more or less rocky and many are connected with the lakes that fairly dot many parts of Sweden. Vast canal improvements have rendered the lakes of great utility for inland commercial enterprises. Lake Wener has an area of 2,014 square miles and other lakes include Wetter, Malar, Tornea, and Hielmar. These and other lakes are situated in the southern part of Sweden. Stora Lulea is in the northern part.

The climate is colder than in Norway, since the country is shut off from the influence of the Atlantic by the Kiolen Mountains. In the southern part it is quite favorable, but the northern section has an extremely long and cold winter. The summers and winters succeed each other with scarcely an intermission of autumn. At Stockholm the mean temperature is 25° in January and 61° in July, and in the northern part the thermometer falls as low as 40° below zero. The mean annual rainfall is 20 inches, but it is scant in the north and quite abundant in the south, where it is 35 inches. Snow covers the entire country in winter, when the skee and sleigh are used extensively. The climate is singularly healthful in all sections of

the country.

MINING. Sweden is rich in mineral wealth, but the output of coal is not sufficient to supply the local demand. This mineral is obtained chiefly in the southern part and the annual output is placed at 275,500 tons. Iron is the most important and valuable mineral product, yielding annually 2,790,000 tons, most of which comes from the district lying north of the Arctic Circle. Since the product is nearly free from phosphorus, the iron of Sweden is unsurpassed in the world, especially for the manufacture of steel. Large quantities are exported to foreign markets. Copper is mined extensively in Falun

and large zinc ore mines are worked on the north side of Lake Wetter. Other minerals include alum, lead, manganese, cobalt, silver, and tin. A superior quality of granite is quarried for monuments and construction purposes. Clays, limestone, sandstone, and sand for glass making are widely distributed.

AGRICULTURE. Sweden is less mountainous and broken than Norway and is better adapted to agriculture, which is the leading industry. Fully three-fourths of the inhabitants are engaged in farming and most of the holdings average in size from five to forty acres. The best farming district is in the southern part, where the soil is fertile and the climate quite favorable, and the tilling is conducted with great care. Oats and rye are the chief cereals. Next in order on the basis of acreage are barley, potatoes, wheat, and pulse. Hay is grown successfully and is an important crop. Sugar beets are cultivated in the southern part, since this enterprise receives encouragement by the government. Other crops are flax, tobacco, hops, apples, and small fruits. Cattle raising is the most important live-stock enterprise and dairying is conducted on a high plane. Other live stock includes horses, sheep, swine, poultry, and

MANUFACTURING. The manufacturing enterprises have progressed materially the last decade, owing to aid extended by the government in developing foreign and domestic trade. However, a lack of coal has made it impossible to produce sufficient to supply the demand in the more important lines. Lumber is sawed in large quantities, both for home use and exportation. Textile fabrics, flour and grist, machinery, paper pulp, beet sugar, pipe tobacco and cigars, clothing, and canned and cured fish are the leading manufactures. Stockholm and Göteborg are centers for the manufacture of cotton and woolen goods and large linen factories are located at Norrköping. The steel goods, armor plates, cutlery, and nails made in Sweden are highly esteemed. Motala and Eskilstuna are the principal centers of iron and machine works.

COMMERCE AND TRANSPORTATION. Sweden has a large coastwise and foreign trade. The imports exceed the exports. Among the leading exports are lumber, minerals, metal goods, oats, and dairy products. The imports consist mainly of wheat, cotton, machinery, coal, and textiles. Foreign trade is carried on chiefly with Great Britain, Germany, Denmark, Russia, Belgium, and Norway. The railway lines in operation equal 9,750 miles, but they are confined largely to the southern part. An important line crosses the northern section, passing through the iron range from the Gulf of Bothnia to West Fiord. About 30,500 miles of telegraph and twice that number of telephone lines are in service. Canal construction received early attention and important connections are thus maintained with the rivers and lakes of the southern part. The highways are in an excellent condition, many having been improved by grading and paving with macadam.

GOVERNMENT. The government of Sweden is a constitutional monarchy and the crown is hereditary in the male line of descent. If there is no direct heir, the king is chosen by a majority vote of the national legislature, but the choice is limited to a member of the Lutheran Church Besides having general executive power, the king has important functions in connection with legislative enactments of the diet or parliament, whose decrees he may veto for cause. He is aided by a council of state and negotiates treaties, presides in the supreme court, and nominates military and civil officials. Legislative authority is vested in the diet, known as the Riksdag, which consists of two chambers. In the upper chamber are 150 members chosen by provincial and municipal councils for nine years, while the lower chamber consists of 230 members elected for three years by property holders. Every male citizen between the ages of 20 and 25 years serves for a brief period in the national guard, and all over 21 years of age may vote under a limited property restriction. The krona, valued at 26.8 cents, is the monetary unit. An army of 36,775 men and officers constitutes the peace footing.

EDUCATION. An excellent system of public schools is maintained, with gratuitous admission and a limited compulsory period. The per cent. of illiteracy is remarkably low, practically all inhabitants of school age being able to read and write. Both the common schools and the universities are modeled on the system of Ger-Two excellent universities are maintained, one at Lund and the other at Upsala, and the courses of secondary schools are articulated with those of these institutions. Fourteen normal schools are maintained for the instruction of teachers and many institutions of a charitable and benevolent character have been provided, such as those maintained for the deaf and dumb, feeble-minded, and homeless. Navigation, agricultural, and mining schools are numerous.

INHABITANTS. The density of population is thirty to the square mile. Practically all the inhabitants are Scandinavians. Lutheran is the state religion and the people hold chiefly to that faith, though religious liberty is granted to all except the Jesuits. The Roman Catholics number 8,750 and the Jews, 2,300. Stockholm, on an inlet from the Baltic Sea, is the capital and largest city. Other cities include Göteborg, Malmö, Norrköping, and Gefle. Population, 1907, 5,377,713; in 1912, 5,503,684.

LANGUAGE AND LITERATURE. The Swedish people belong to the Scandinavian branch of the Germanic family and are characterized as industrious and persevering. They are largely of a tall, robust stature, and have blue eyes, light hair, and a light complexion. It is probable

that their language had its beginning more than 4,000 years ago, but nothing is known of it prior to the Christian era. The dialect is closely allied to that of Norway and less closely to the Danish and Icelandic. German had a wide influence upon the language in the time of the Hanseatic League and the introduction of Protestantism, and a considerable element of Latin was injected through the clergy.

The more recent literature dates from the 13th century, but there is a translation of the Bible, known as the Ulfilas' Gothic translation, which was made in the 5th century and is considered the oldest writing in the Germanic-Swedish tongues now extant. Heroic and chivalric ballads from the 13th century are numerous, while lyrics and biblical translations of the 14th century are quite extensive. In 1478 the University of Upsala was founded, and the art of printing was introduced at Stockholm in 1483. The adoption of Christianity in the 16th century brought hymns and poems into extensive use, but a complete translation of the New Testament was not made until 1526, when that beneficial work was completed by Olaus Petri. Laurentius, in 1541, translated the Old Testament and wrote numerous hymns and poems. "Svensk Kronika" is a historical work written by Olaus, who is the author of a number of dramas. "Captive Cupid" is a poetic production

dramas. "Captive Cupid" is a poetic production of Stjernhjelm (1598-1672).

Swedish literature was greatly extended in

the reign of Gustavus Adolphus, who imported large libraries, founded schools, and invited learned men from abroad to assist educationally. The name of Linnaeus stands preëminent among the naturalists of Sweden and of the world, and both his writings and pupils exercised a wide influence. In the 18th century many theological writers were added to the list. The literary men of that period include Olof von Dalin (1708-1763), Swedenborg (1688-1772), Tobern Olof Bergman (1735-1784), Linnaeus (1707-1778), Celsius (1701-1744), Karl Wilhelm Scheele (1742-1786), who also wrote in German, and Kark Mickel Bellman (1740-1795). Mörk (1714-1763) is an eminent Swedish novelist; Berzelius (1779-1848), a celebrated chemist; Geijer (1783-1847), one of the noted historians; and Tegnér (1782-1846), one of the chief poets. Tegnér's most noted work is called "The Story of Frithiof" and has been translated into many European and Asiatic languages. Bremer (1801-1865) is a Finnish poetess who wrote many fine productions in the Swedish. Other eminent poetesses include Baroness Knorring and E. S. Karlén. Victor Rydberg is one of the most recent writers and the author of "The Last Athenian," a famous novel. Edgren is a recent dramatist; Struidberg, a novelist; and Snoilsky, a poet.

HISTORY. The early history of Sweden is wrapped in legendry. In the primitive historic stage numerous tribes occupied the different sec-

tions. In the southern part were the Goths, from whom the region is still called Gothland, and in the central part or Svealand were the Swedes. These two groups comprised the most powerful of the native tribes. Christianity was introduced in 829, but the old pagan religion was not overthrown until in the reign of Ingiald (1080-1112), when the temple of Upsala was burned. Eric the Saint succeeded to the throne as ruling sovereign in 1155, and under his direction Christian doctrines were disseminated by the building of churches and schools, but he was slain in 1160 by Magnus Henriksen, a Danish prince. Margaret of Denmark was chosen queen in 1389 and Sweden soon joined the Union of Calmar. In 1523 Gustavus Vasa defeated the Danes and was made king. In 1529 he adopted the Lutheran faith as the national religion. Though he found an empty treasury and an exhausted country, he established the material industries, built cities, and founded highways and institutions of learning. He was succeeded by his son, Eric XIV., who reigned only eight years, owing to a loss of his reason, and his brother ascended the throne as John III. It was the desire of John to restore the Catholic faith, but he died in 1592, to be succeeded by his son, Sigismund. The latter had been brought up in the Catholic faith and followed the course of his father in seeking to restore Catholicism, though he had previously promised to support the Protestant faith, and was accordingly deposed, in 1604, and the crown was given to his uncle, Charles IX.

Charles IX. died in 1611 and was succeeded by his son, the celebrated Gustavus Adolphus, who took a leading part in the Thirty Years' War by invading Germany to defend Protestantism, but lost his life in 1632 at the celebrated Battle of Lützen. The latter had left his noted minister, Oxenstiern, to administer the government in his absence, and he was appointed regent for his daughter, Christina. In 1654 Christina renounced the crown in favor of her cousin, Charles Gustavus, who assumed the title of Charles X. After conducting successful military enterprises in Denmark, Poland, and Russia, he died suddenly and was succeeded by his son, Charles XI., in 1660. This sovereign was only four years old when his father died and thus ruled under a regency until 1680, when he assumed the government. He greatly extended the power of the king, reorganized the army, and encouraged industrial arts. On his death, in 1697, he was succeeded by his son, Charles XII. This military genius conducted extensive operations against Poland, Denmark, and Russia, but was finally defeated at Poltava on July 8, 1709, thus being required to yield to the military superiority of the Muscovites. He subsequently pursued a scheme to conquer Norway, but on Nov. 30, 1718, was killed at Frederickshall. Ulrica Eleonora, his second sister, succeeded him on the throne. She was assisted in

the government by her husband, Frederick of Hesse-Cassel.

Both Eleonora and her husband. Frederick I., were mere puppets in the hands of the nobles, and Sweden was dominated by a powerful oligarchy. The two parties were known as the French, or Hats, and the Russians, or Caps. the former favoring French and the latter Russian predominance in Sweden. Frederick died in 1751 and was succeeded by Adolphus Frederick of Holstein-Gottorp, the latter giving favors to Russia. He died in 1771 and was succeeded by his son, Gustavus III., who overcame the two factions and recovered the former power of the crown, Factional disagreements were the cause of his assassination in 1792, and he was succeeded by his son as Gustavus IV. This sovereign lacked ability to cope with the difficulties of his time and he was finally deposed in 1809, being obliged to renounce the crown in favor of his uncle, Charles XIII. Charles was soon after required to cede a fourth of his territory to Russia. The dominant party elected Jean Baptiste Bernadotte as crown prince in 1810 with the erroneous idea of conciliating Napoleon.

Sweden joined the allies against Napoleon in 1814, but Denmark declared in favor of France, thus bringing on a war with the Danes. The peace of 1814 gave Sweden possession of Norway, but it lost Pomerania to Denmark, thus confining its sovereignty to the Scandinavian peninsula. Bernadotte succeeded to the crown in 1818 as Charles XIV. and reigned successfully until his death, in 1844, when he was succeeded by his son, Oscar I. His reign was peaceful and enabled Sweden to begin material industrial development, and on his death, in 1859, he was succeeded by his son, Charles Louis Eugene, as Charles XV. He died in 1872 and his brother, Oscar II., was crowned as his successor.

The long reign of Oscar II., a period of 36 years, was signally successful. It witnessed extension of the right of suffrage, the enlargement of the merchant marine, the building of canals and railroads, and the larger development of the industrial and mining enterprises. One of the problems of the dual kingdom under this sovereign was to satisfy the people of Norway, who finally declared their independence in 1905. The separation was brought about without bloodshed, largely through the self-restraint of King Oscar, who now governed under the regency of the Crown Prince Gustaf. On the death of his father, in 1907, the latter was crowned king as Gustaf V.

SWEDENBORG (swe'den-borg), Emanuel, eminent author and scientist, born in Stockholm, Sweden, Jan. 29, 1688; died in London, March 29, 1772. He was a son of Jasper Svedberg, bishop of Skara, and studied at the University of Upsala, where he graduated with high honors. In 1710 he entered upon an extended

tour of Europe that covered four years, visiting in the meantime Holland, Germany, France, England, and other countries. On returning to Sweden, he was appointed by Charles XII. as



EMANUEL SWEDENBORG.

assessor extraordinary to the Royal College of Mines. In that capacity he invented a vehicle to transport cannon to the siege of Frederickshall, wrote a treatise on the orbit and position of the earth and planets, prepared an extended outline on algebra, devised a monetary system, and

published several lectures on the tides. Queen Ulrica, in 1719, recognized these services by ennobling the Svedberg family and changing the name to Swedenborg. He gave little heed to official formalities, but engaged his mind with mechanical and economical projects, and in 1724 declined a professorship of mathematics at Upsala.

In 1734 Swedenborg published at Leipsic a large work entitled "The Philosophy of Minerals," which attracted the attention of the most distinguished scholars of Europe. About the same time he published "First Principles of Natural Things," "The Final Cause of Creation," and the "Intercourse Between the Soul and the Body." From 1736 to 1740 he made a second tour of Germany, France, Holland, and Italy, and on returning published "Economy of the Soul-Kingdom." He resigned the post of assessor in 1747 to devote himself exclusively to the study and advocacy of spiritual things, and was given a pension equal to the half of his salary. Swedenborg claimed a revelation that made it necessary for him to interpret the word of God according to its true meaning, claiming that he had been in spiritual intercourse with a divine being and had been shown the world of spirits. While his eyes were thus opened to the scene of heaven and hell, he claimed to have conversed with acquaintances who had departed from this life as well as noted men of antiquity. He did not attempt to organize societies, but taught his doctrine in an unassuming but effectual way, gaining large numbers of adherents. However, since his death many societies based upon his teaching have been organized. Among the writings of Swedenborg not mentioned above are "New Jerusalem and Its Heavenly Doctrine," "The Apocalypse Explained," "Angelic Wisdom," "Heaven and Hell," "Conjugal Love," "Divine Love and Wisdom," and "Divine Providence."

SWEDENBORGIANS (swē-den-bôr'jǐ-ans), or New Jerusalem Church, the followers of Emanuel Swedenborg. The tenets of this so-

ciety of religious worshipers embrace the belief that God is a trinity, not of persons, but of principles corresponding to the soul, the body, and the operative energy in man. Heaven and hell are believed to exist in this world as states of the soul, and it is assumed that these states are perpetuated in the spiritual world. Since the soul is thought to have a spiritual existence of its own, the material resurrection of the body is denied. Salvation implies faith, repentance, and obedience to the moral law. It is claimed that the last judgment occurred in the spiritual world in 1757, at which time Swedenborg received a revelation, and the new church then established marks the second dispensation of Christianity. The first Swedenborgian church organized in America was opened at Baltimore in 1792. At present there are 175 ministers, 212 societies, and 10,990 members in the United States. Among the educational institutions are the New Church School at Waltham, Mass., and Urbana University, Urbana, Ohio. The Swedenborgians have a considerable membership in France, Germany, England, and other European countries.

SWEET, Alexander Edwin, publisher and author, born in Saint John, New Brunswick, March 28, 1841; died May 22, 1901. In 1849 he accompanied his father to San Antonio, Tex., of which city the latter afterward was mayor. He attended the public schools, studied at Poughkeepsie, N. Y., and subsequently attended the Polytechnic Institute at Carlsruhe, Germany. In 1863 he returned to America to enter the cavalry of the Confederate army. Subsequent to the war he studied law and practiced that profession in San Antonio, and in 1879 became editor of the Express, published in that city. He was editor at different times of the San Antonio Herald, contributed to the Galveston News, and in 1881 founded the Texas Siftings at Austin, which he removed to New York after three years, where it was published until 1891. The writings of Sweet are characterized by remarkable humor and close discern-"On a Mexican Mustang Through Texas from the Gulf to the Rio Grande," published with J. Amory Knox, is one of his best known works.

SWEETBRIER, or Eglantine, the name of several species of the rose, found native in many parts of Europe. It grows wild in pastures and neglected fields, and under favorable circumstances sends out numerous shoots or suckers. The leaves are fragrant and the flowers, which appear mostly on the lower branches, are fragrant and of a light rosy color. Sown in rows along walks, the foliage may be clipped into shape to form low and ornamental hedges. Several species have been naturalized in America.

SWEET FLAG, the name of a plant found in marshes of the Northern Hemisphere, described in medical works under the name Acorus

Calamus. The leaves are long and slender, the stem is aromatic, and at the upper part of the latter is a greenish spike of flowers. The medical properties, which are derived chiefly from the root, serve as a tonic and a stomachic. A preparation made from this plant is used in

preparing a hair powder.

SWEET PEA, a flowering plant grown in gardens and parks. The seed is planted early in spring, usually in rich and well-cultivated ground, and is covered with two or three inches of loose soil. When the plants are about three inches high, a trellis is constructed along the rows as a support to prevent them from falling to the ground. The sweet pea blooms early in summer until the beginning of fall, provided the pods are not allowed to ripen. About 100 species have been cultivated for their flowers, which are variegated in colors and highly fragrant.

SWEET POTATO. See Potato, Sweet. SWEET WILLIAM, the name of a species of pink, cultivated extensively as a flower in gardens. Several species grow wild and bear pale lilac-colored or bluish flowers in spring and

early summer. See Pink.

SWETT (swet), John, educator and author, born in Pittsfield, N. H., July 31, 1830. He studied at the Pittsfield Academy and the Merrimac Normal Institute and began to teach in the district schools in 1847. In 1853 he was made principal of a grammar school in San Francisco, and ten years later became State superintendent of schools in California. While in this position he did much to enrich the course of study and reorganize the schools on a more systematic basis. In 1870 he was appointed deputy superintendent of schools in San Francisco, of which he became the city superintendent in 1876, and after thirteen years he retired from active educational work. His books include many texts that have been used extensively, and he was joint author with William Swinton of numerous texts on grammar, language, and geography. Among his works are "Methods of Teaching," "School Elocution," "American Public Schools," and "History of the Public School System of California."

SWEYN (swan), or Svend, King of Denmark and father of Canute the Great, born about 950; died in 1014. He invaded England about 1002, when he ravaged a large part of the country, and in 1013 made a second invasion. Ethelred, King of the Anglo-Saxons, was compelled to flee and his country was made tributary to Denmark. Although he proclaimed himself king, his power was not firmly established before his death and the government was left to his son, Canute.

SWIFT, a genus of birds of the swallow family, so called because of their rapid flight. They are widely distributed and include numerous species, most of which are migratory

birds. Though the outward appearance is quite like that of the swallow, there is a marked difference in structure. Their flight is more rapid and steady, and they have a scream instead of a mere twitter, while a number of species are larger. They are seldom seen at rest, but remain almost constantly on the wing. The American swift is about five inches in length, but measures twelve inches in extent of wing. Its color is brownish-black and its nests are built largely near to or on buildings. The common swift of Europe is larger than the swallow, its wings measuring fully eighteen inches when expanded. It is a familiar bird around houses, where it builds a nest of twigs broken from trees, and in many instances utilizes small houses constructed for nesting. Several species of swifts build edible nests, especially those of Madagascar and the East Indies. The esculent swift, or swallow, is the bird most noted for building edible nests. In this species the female

lays two eggs.

SWIFT, Jonathan, eminent satirist, born in Dublin, Ireland, Nov. 30, 1667; died Oct. 19, 1745. He was a son of an Englishman named Jonathan Swift, who served as steward of a court in Ireland, but the early death of his father caused his childhood years to be spent in poverty and dependence. After attending the Kilkenny School, he secured help from relatives to enter the Dublin Trinity College, where he remained seven years. Soon after he removed with his mother to England, where he was admitted to the home of Sir William Temple, an old acquaintance of the Swift family, and in 1694 became a clergyman with a charge in Ireland. This he resigned two years later to return to the home of Mr. Temple, who died in 1698 and left his writings to be edited by Swift. He returned to Ireland after completing that work and was made vicar of Laracor with a salary of \$2,000 per year, and in 1713 was appointed dean of Saint Patrick's Church. The first writing from his pen was published in 1704 with the title of "The Tale of a Tub," and to it he afterward appended "The Battle of the Books." The former is a humorous satire in relation to three of the leading churches and brought him to ill repute among a large class of church adherents, and the latter had been written some time before in support of his patron, Sir William Temple.

Swift published a number of circulars and pamphlets in behalf of the English government in the period between 1705 and 1710, in which he gave the Whig principles loyal support, but in the latter year went over to the Tories, on whose side he continued to intrigue and publish satirical pamphlets. It was his ambition to hold an English bishopric, but his authorship of "The Tale of a Tub" proved fatal to him. Swift, failing to secure recognition under the English government, made an attack upon it in pamphlets, but withheld his name from the public. An award of \$1,500 was offered to secure the name of the author, but his friends in Ireland had no thought of betraying him, and instead raised him to the highest popularity ever accorded an English appointee among the Irish. In 1726 he made his last visit to England, when he published his "Gulliver's Travels," the most popular of his works.

It is supposed that Swift was secretly married to Esther Johnson, a lady with whom he became acquainted while residing with the Temple family and who is known in his writings as Stella. However, while on one of his visits to London he became acquainted with Hester Vanhomrigh, the daughter of a wealthy merchant, who was passionately fond of him. The incidents of Swift's life connected with these two ladies are of interest to literature, and the correspondence with the former was published as his "Journal to Stella." Other writings include "Public Spirit of the Whigs," "Reflections on the Barrier Treaty," "Conduct of the Allies," "Proposal for the Universal Use of Irish Manufactures," "Project for the Advancement of Reli-gion," "Drapier's Letters," and "Predictions for the Year 1708."

SWIMMING, the act of moving in water by natural means of propulsion, as by the movements of limbs, fins, or other organs of the body. As an art, swimming is exceedingly useful, both as an exercise for the body and as a protection to life, and for these reasons it is quite important that all young persons acquire skill in moving safely in the water. The human body, when the lungs are inflated, is slightly lighter than an equal volume of fresh water, thus making it quite easy to float on the surface. Salt water being heavier than fresh, it is still less difficult to swim in salt-water lakes and the sea than in fresh water. When in the water there is a natural tendency for the head to sink while the body is in a floating condition, hence it is of much importance to keep the head above water and the lungs inflated with air as much as possible. In order to keep the head above water, the swimmer must endeavor to keep the body up to the shoulders below the surface.

When learning to swim, it is best to frequent a guite sandy beach of limited depth, thus avoiding the danger of getting into water too deep for safety. Greater security is insured by attaching corks, inflated bladders, or air belts near the shoulders. Movement forward in swimming is produced by the arms and legs being extended and adducted consecutively. Various skillful arm movements should be practiced, such as over-hand, half-circle, and side movements. Skillful swimmers employ these either singly or in different combinations. Most swimmers aim to move forward on the breast, especially in making long distances, but well-trained swimmers are able to make considerable speed by swimming on the side or back. Beginners are usually prevented from readily learning the art of swimming for want of confidence, and later often develop overconfidence to such an extent that fatal results are not infrequent.

A swimmers' union was organized in the United States in 1888, whose purpose is to develop swimming into a more popular and highly accomplished art and to give annual swimming contests. Among the best records made by contestants are the following: 440 yards in 5.51 minutes; 880 yards in 12.45 minutes; 220 yards in 2.38 minutes; 300 yards in 3.46 minutes, and 150 yards in 1.38 minutes. The Olympic games of 1908, in England, brought several of the best swimmers of the world into competition. Various conditions are essential in order to secure the best results in the matter of speed. It is possible to swim with greater rapidity with the current than against it, or even with the wind, and the depth of the water influences materially. One of the remarkable instances of swimming is that of Matthew Webb, who, in 1875, swam from Calais, France, to Dover, England, making the distance across the English Channel in 22 hours, but he was driven by the tide in a zigzag course, so the distance actually swam was about 50 miles.

Many animals have a greater or less capacity for swimming, either in or on the surface of the water. Fishes are the best swimmers. They effect a rapid forward movement by means of their fins and tail, but some species propel themselves by undulations of different parts of the body. Some crustaceans swim by flapping their shells, and others by ejecting water from the body. Quadrupeds swim easily, the head being so placed as to remain naturally above the surface.

SWINBURNE (swin'bûrn), Algernon Charles, poet and essayist, born in London, England, April 5, 1837; died April 10, 1909. He descended from a noble family, being a grandson of Earl Ashburnham, and his father was Admiral Charles H. Swinburne. After studying at Eton, he entered Oxford University, but left without taking a degree in order to accompany W. S. Landor to Italy. His first writings were published in 1861 under the titles of "The Queen Mother" and "Rosamond," but the first production to attract wide attention was his "Poems and Ballads," published in 1866. Subsequently his writings were very numerous and extensively read, some of them going through many translations and editions. His style is masterful and interesting and his command of language is extraordinary. Among the poetical productions are "Song of the Spring Tides," "Ode on the are "Song of the Spring Times," "Song Proclamation of the French Republic," "Song Sunrise," "Select of Italy," "Songs Before Sunrise," "Select Poems," "Astrophel," and "A Century of Roundel Poems." His works in prose include "Life of Victor Hugo," "Study of Shakespeare," "Criticism of Rosetti," "Study of Ben Jonson," "Essays and Studies," and "Studies in Prose and Poetry.'

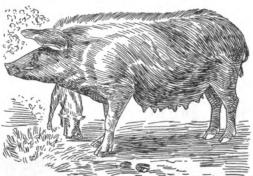
SWINE, or Hog, a genus of hoofed mammals. They include species that are highly important for food and other products. The neck is very thick and strong, the head is prolonged, the eyes are small, and the nose is slightly truncated. Stiff bristles cover the thick skin of most species. Underneath the bristles are short, curled hairs. The feet have four toes, all separately hoofed, but only the two front toes reach the ground. In a wild state the male has enlarged bristles on the back of the neck that form a kind of mane, but this disappears in the highly domesticated species. The tail is short and fleshy. Their food consists of almost every kind of vegetable and animal substances, but in a wild state they cannot be reckoned with the beasts of prey, though poorly fed swine often attack chickens and other small domestic animals. Two or more litters of young are brought forth each year, usually ranging from five to fifteen in number, thus making them the most prolific of domestic animals.

The domestic hog is a descendant of the wild

pork are consumed in the military and naval service, largely because it takes salt more readily than any other flesh.

The culture of swine is a highly important industry along with farming. Corn is the favorite food, which is fed either ground or from the ear, but barley, rye, wheat, and other cereals are fed to a considerable extent, though chiefly in a ground condition. The gluttonous disposition of the hog makes it possible to rear herds in rapid succession. They can be placed on the market with profit when only six to twelve months old The young litter brought forth in the spring is counted the most valuable, as the small pigs can then accompany the sow to pasture, the young vegetable growth being highly valuable in addition to milk and cereal food.

Many breeds of hogs are reared in Canada and the United States. Those reared the most extensively include the Poland-China, Chester White, Berkshire, Jersey, Yorkshire, Neapolitan, and Essex. The Poland-China, which is a representative breed, is either black or black with



UNIMPROVED HOG.

whitish spots, while other breeds are pure white. Iowa is the greatest hog State in the Union. Others taking are Illinois, Missouri, Ohio, Indian Nebraska, and Kentucky. The total hogs produced annually in the Uniaggregates 175,500,000 head, represent of \$2,150,500,000. Ontario is the lease of \$2,150,500,000.

boar, which is still found in some parts of Europe and Asia, but the breeds have been improved remarkably by careful husbandry, making them larger in size, finer in quality, and more docile in spirit. Hogs are clean but savage in the wild state, and in the domestic state partake largely of their surroundings, being highly clean and quite intelligent under careful treatment. No animal is more important in the productive industries, though its flesh is considered un-wholesome in some of the warmer countries. The flesh of swine was not admissible as a food under the Mosaic law, and it is still prohibited by the Jews and Mohammedans. Lard is the fat of the hog rendered under high temperature, and is considered the most valuable of the fats for many purposes. The skin is tanned for use in bookbinding and saddlery, the bristles are used for brush making, and the hoofs yield mucilage. Pork is the name generally applied to the flesh, which is eaten in a fresh or salted state, and is converted to a large extent into bacon, sausage, and hams. Vast quantities of cured

whitish spots, while other breeds are reddish or pure white. Iowa is the greatest hog-producing State in the Union. Others taking high rank are Illinois, Missouri, Ohio, Indiana, Kansas, Nebraska, and Kentucky. The total number of hogs produced annually in the United States aggregates 175,500,000 head, representing a value of \$2,150,500,000. Ontario is the leading hogproducing Province of Canada. Hogs are shipped alive to the market, where they are sold to packing houses and butchered, and the meat is prepared to be suitable for consumption. Among the leading packing-house centers of North America are Chicago, Kansas City, South Omaha, Sioux City, Cincinnati, Toronto, and Montreal. American pork is transported to practically all countries of the world, especially to Germany, France, and England, where the production is not sufficient to supply the demand. See Meat Packing.

SWING, David, clergyman, born in Cincinnati, Ohio, Aug. 23, 1830; died Oct. 3, 1894. He spent his early life on a farm. In 1852 he

graduated from Miami University, Oxford, Ohio, and soon after began the study of theology. However, he was made professor of languages in Miami College, where he lectured twelve years, preaching occasionally in the meantime. He became pastor of the Fourth Presbyterian Church in Chicago in 1866, where he ministered until 1874, when it was charged that his doctrines were heterodox and he was placed on trial before the presbytery. The investigation extended several weeks and he was acquitted, but withdrew from the presbytery and held independent services. His eloquence and able discussions attracted large congregations. Among his chief writings are "Truths for To-day," "Old Pictures of Life" and "Sermons"

Pictures of Life," and "Sermons."

SWINTON (swin'tŭn), William, author, born in Haddingtonshire, Scotland, April 23, 1833; died in New York City, Oct. 24, 1892. He accompanied his mother to Montreal, Quebec, while a youth, and studied in Amherst College, Massachusetts. In 1853 he began to teach, holding professorships in Mount Washington Institute, New York, and several other institutions. In the meantime he contributed to Putnam's Magazine. At the beginning of the Civil War he became field correspondent of the New York Times. Subsequently he devoted himself to lit-His chief publications include sive Battles of the War," "Camerary work. "Twelve Decisive Battles of the War," "Campaigns of the Army of the Potomac," "Masterpieces of English Literature," and "Review of McClellan." Swinton is best known by his school text-books, which include those on reading, literature, word analysis, and spelling.

SWISS GUARD, the famous regiment maintained in France and composed exclusively of Swiss. It was first organized by a royal decree in 1616. During the Revolution of 1789 the members of this regiment remained loyal to the government, but on Aug. 10, 1792, while defending the Tuileries against a mob, they were overwhelmed and many were massacred. About 800 of their number fell that day, and their memory is commemorated in Thorwaldsen's "Lion of Lucerne," cut in a cliff at Lucerne, Switzerland. In 1815 an effort was made by Louis XVIII. to revive the Swiss Guard, but the body was disorganized in the Revolution of 1830.

SWITZERLAND (swit'zēr-land), in German, Schweiz, a republic of Central Europe, located between 45° 50′ and 47° 50′ north latitude and 5° 48′ and 10° 28′ east longitude. It is bounded on the north by Germany, east by Austria-Hungary, south by Italy and France, and west by France. The length from east to west is 208 miles and the width is 128 miles. The Jura Mountains form the natural boundary between Switzerland and France, and the southern boundary is mainly by the crest of the Alps, but the other borders do not conform to natural features. The total area is 15,976 square miles.

DESCRIPTION. The surface is diversified by lofty ranges, beautiful lakes, extensive glaciers, and

fertile valleys. Both the Alps and the Jura Mountains traverse various sections, the former largely in the south and the latter along the western boundary. The Alps separate the country from Italy, where they reach their highest altitudes in Mont Blanc, Mont Rosa, and Mont Jungfrau, which lie at or near the border. The general elevation of the Alps in Switzerland ranges from 6,000 to 9,000 feet, reaching their culminating peak in Mont Rosa, height 15,217 feet. Peaks of considerable altitude occur in the Jura Mountains, this chain being linked to the Alps by a range called the Jorat, but they do not exceed 5,505 feet, which is the elevation of Mont Dôle, the highest of this range in Switzerland. The snow line is about 9,250 feet above sea level, hence Switzerland has a large area of perpetual These collectively exercise a prolific modifying influence upon the climate. Much of the central part of the country is a plain, with an elevation of 1,300 feet above the sea.

The rivers are not large, but they are important as sources of water power. They are well supplied with water the entire year, since the melting snow of the Alps feeds them during the period when rainfall is not abundant. Many of the important rivers of Europe have their source in Switzerland, including the Po, the Rhine, and the Rhone. However, the Rhine and its tributaries furnish the greater part of the drainage, but the swiftness of the streams makes them almost useless for navigation. The Aar, a tributary of the Rhine, is navigable by vessels of considerable size and carries a larger volume of water to their junction than the Rhine itself. Lake Geneva is entered by the Rhone, which carries the overflow across the border into France. The Ticino, a head stream of the Po, crosses the border into Italy. Considerable drainage is carried by the Inn to the Danube, which it enters at Passau, where it discharges a larger volume of water than the Danube itself. Lake Constance, in the northeastern part, is partly in Germany. The largest body of water within the country is Lake Geneva, on the southwestern border. Other lakes include Zürich, Thun, Lucerne, Neuchâtel, Brienz, Bienne, and The interior lakes belong to the Maggiore. Rhine basin, while Lake Geneva is drained by the Rhone, and Lake Maggiore, partly in Italy, has its outlet through the Po.

The climate is necessarily varied according to altitude and proximity to the snow-capped mountains, but all sections are healthful and agreeable. A temperate climate prevails on the central plain and in the valleys, where the mean annual temperature is about 50°. With every thousand feet of ascent the temperature diminishes three degrees, hence the elevated valleys have a severely cold atmosphere in winter. Clouds hover over the higher Alps most of the time, and here the rainfall ranges from 70 to 90 inches. In the central plain the rainfall is 30 inches. A warm wind from the south, called

the Föhn, frequently causes a rapid melting of the snow and consequently inundations and avalanches.

The mining industry does not pro-MINING. duce sufficient to supply the demand of the more important minerals. Anthracite coal is mined near Bern, in Fribourg, but large quantities are imported from Germany and Austria. Salt rock is found in several of the cantons and the yield Val des is sufficient to permit exportation. Travers has valuable deposits of asphalt, slate is found in Glarus, and marble quarries are worked in Ticino and Schwyz. The Jura Mountains contain deposits of iron ore, though the output of this mineral is not sufficient to supply the demand. Granite, marble, and limestone are found in large quantities suitable for building purposes, and clays for brick and pottery are abundant. Other minerals include slate, manganese, and rock crystals of great beauty. Mineral waters are abundant in the mountain springs.

ACRICULTURE. Two-thirds of the inhabitants engage in farming. Fully 72 per cent. of the area is productive, and the lands are owned largely by peasant proprietors. Thirty-six per cent. of the surface is hay and pasture land, which is considered the most valuable, and farming is conducted with the greatest of care and most watchful attention. Wheat yields profitably up to elevations that range 2,500 feet above sea level, but the amount grown is not sufficient to supply the demand. Rye, oats, potatoes, and barley are the chief crops, and large interests are vested in the cultivation of vegetables and fruits. The grape industry is well developed in all the cantons, but the best wine is obtained from Geneva and Neuchâtel. Almonds, chestnuts, olives, and lemons are grown in the warmer cantons of the south, where the hillsides are dotted with fine orchards. Gardening and flower-growing receive marked attention. Considerable progress has been made in the industry of cultivating the mulberry tree and silkworms. Cattle raising is carried on generally in the country, owing to the extensive grazing lands that are too hilly for cultivation. Dairying is highly developed and Swiss cheese is exported to all parts of the world. Other domestic animals include horses, sheep, goats, swine, and poultry. Switzerland is visited annually by a great influx of tourists, making it necessary to import large quantities of meat. However, the lakes and rivers abound in fish, and pisciculture is promoted by a large number of establishments. Lands that are used for grazing are partly timbered, but fine forests too dense to produce grasses are found in some sections. The forest trees include the beech, walnut, maple, oak, and pine.

MANUFACTURES. Switzerland has extensive interests in manufacturing, although it has no seaports and does not produce sufficient coal and iron. The government has given encouragement through the maintenance of industrial and tech-

nical schools for the dissemination of knowledge in mining, dairying, agriculture, and architecture. Ample water power is furnished by the streams. The manufacturing centers are near the markets of adjoining countries where raw materials can be obtained and the finished products may be sold. The people are skillful and persevering, and it is characteristic of them to utilize their resources to the best possible advantage. Textiles and metal products are of first importance, and in the quality of lace and embroidery the country is unexcelled. Basel is the center of the silk industry, especially in the manufacture of silk ribbons, and large quantities of dress goods are woven at Zürich. The manufacture of clocks and watches is the leading metal industry and the chief centers of this enterprise are at Locle and Geneva. Other manufactures include musical instruments, pottery, tobacco products; sugar, jewelry, leather, and machinery. Canned milk and fruits, wine, and cheese hold a high place in the list of manufactures.

COMMERCE AND TRANSPORTATION. Switzerland occupies a singular position commercially, since it has a large foreign trade in spite of the fact that it produces insufficient quantities of nearly all of the raw material to supply the demand. It exports large quantities of cotton and silk textiles, lace and embroidery, wine, cheese, jewelry, and watches. The imports consist principally of coal, raw cotton, grain, iron, and petroleum. Trade is principally with Germany, France, Italy, Great Britain, Austria-Hungary, and the United States. While the American imports are not extensive, large quantities of manufactured products are exported to American ports.

The country has excellent highways and extensive canal facilities, besides railroads aggregating 3,525 miles. About half of the railways are owned and operated by the government. The telegraph lines aggregate a total of 15,500 miles under government control and 10,500 miles under private ownership. Connection by railway is made with Italy through the Saint Gotthard tunnel. The lakes are important for navigation. A harbor of considerable extent is maintained at Basel, whence shipments are made via the Rhine to Strassburg and other points in Germany. The highways are in an excellent condition in all parts of the country.

GOVERNMENT. The government of Switzerland is a constitutional republic, the chief executive functions being vested in a national council of seven members chosen by the assembly. The president of the confederation is the highest executive officer and is elected by the federal assembly. The legislative authority is vested in the federal assembly, which consists of two divisions, the state council and the national assembly. Nineteen cantons and six half-cantons constitute the confederation. The government is administered under a constitution dating from 1874. The state council is constituted of 44

members, two from each canton, and the national assembly is formed of members chosen by direct vote of the adult population at the rate of one representative for every 20,000 inhabitants. Federal elections are held every three years, but the president and vice president are chosen by the federal assembly for a term of one year, and may not be reëlected until after having been out of the office at least one year. The national judiciary, called the federal tribunal, consists of nine members elected by the federal assembly for six years and has appellate jurisdiction of both civil and criminal cases. Switzerland has no standing army in the usual sense of the term, but the army is made up of all citizens of military age. The organized military force is classed into the three divisions called the Auszug, the Landwehr, and the Landsturm. The first includes all men between 20 and 22; the second, those from 32 to 44; and the third, those of 17 to 50 years not included for any reason in the other two divisions. Children of eight years and over are given military instruction, which is promoted and encouraged by means of annual exercises and reviews. The war footing is given at 528,250 men.

EDUCATION. A free system of public schools is maintained, to which attendance is free and obligatory. The requirement to attend school is rigidly enforced in the Protestant cantons, but it is neglected in a number of the others. Illiteracy has been reduced to 1 per cent. Besides the common schools, there are ample provisions for higher education. The celebrated institutions of higher education include the universities of Bern, Geneva, Zürich, Basel, and Fribourg, to which students are attracted from all parts of Europe. Academies with extensive courses are maintained at Geneva and Lausanne. Zürich has a federal polytechnic school. Freedom of worship is extended to all the sects, but the Jesuits are not permitted to maintain organizations. A large majority of the people belong to the Evangelical Reformed Church, a branch of the Lutheran Church. About one-fifth of the inhabitants are Roman Catholics.

The inhabitants of Switzerland INHABITANTS. were known as the Helvetians to the Romans. These people were of Celtic origin and were later influenced by the Rhaetians and the Teutons, the latter taking precedence. German is the prevailing language and is spoken by 2,350,-000 of the inhabitants, while the remainder use the French, Italian, and Romansch languages, the last mentioned being a form of the Latin, frequently called Rhaetian. According to the latest estimates, there are 725,500 French, 220,-500 Italian, and 38,500 Romansch in the country. Bern, on the Aar, is the capital. Other cities include Zürich, Basel, Geneva, Lausanne, Saint Gallen, Chaux-de-Fonds, and Lucerne. Population, 1910, 3,753,293.

LITERATURE. No country takes higher rank from the standpoint of literacy and refinement,

and among the great writers and statesmen of Switzerland are names that add luster to its nationality. The literature belongs almost exclusively with that of the Germans, but includes the products of a number of eminent writers classed with the French and Americans. Among the most eminent literary men may be named Pestalozzi, Breitinger, Sulzer, Johann von Müller, Bodmer, Haller, J. J. Rousseau, Hottinger,

Hirzel, Gesner, Bonnet, and Agassiz.

HISTORY. The region now included in Switzerland was populated at the beginning of the historical period of Western Europe by the Helvetians in the north and the Rhaetians in the south, and both became subject to the Romans about 58 B. C., under whom they remained until about 215 A.D. Incursions were made by the Alemanni, who joined Switzerland to the German Confederation, and later settlements were formed by the Burgundians and Goths. Subsequently the Franks under Clovis made a number of settlements, and the whole region came under Frankish control in 534. Christianity was introduced among the Burgundians in the 5th century, but the Helvetians retained their pagan worship until the 7th century. It formed a part of the Frankish empire under Charlemagne, but his successors annexed a part to France and a portion to Germany, and in the early part of the Middle Ages the entire region was united to the German Empire. Feudalism was introduced soon after and the counts were only in part dependent upon the German emperors. However, a series of civil wars were instrumental in securing the freedom of several cantons and special charters for many of the towns. The counts of Hapsburg secured possession of Unterwalden, Uri, and Schwyz, three of the forest cantons, in the early part of the 13th century, and assumed the right to govern as sovereign rulers. The claim to sovereignty was denied by the cantons and the citizens organized to expel the Austrian counts. This, according to tradition, was effected by solemn compact made on Nov. 7, 1307.

We learn from traditional accounts that 31 representatives met at night in a solitary spot near Lake Lucerne, where the compact was subscribed to and those interested were bound by oath to its observance. The leaders chosen were Stauffacher of Schwyz, Arnold of Unterwalde:, and Furst of Uri, with his son-in-law, Willi a Tell. These leaders aroused the peasants to the duty of maintaining their freedom and independence and on Jan. 1, 1308, successfully deposed and expelled the Austrians. An invasion under the Austrian counts soon followed, but the Swiss defeated them with great loss at Morgarten in 1315, thus securing the independence of the three cantons. They annexed the city of Lucerne in 1332, Zürich in 1351, the cantons of Glarus and Zug in 1352, and Bern in 1353. However, Austria claimed jurisdiction of the cantons of Glarus and Zug and the city of Lucerne, and accordingly invaded Switzerland,

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but the Austrian army was defeated by the Swiss under Arnold of Winkelried at the Battle of

Sempach in 1386.

The Swiss became aggressive in 1415 and invaded Aargau and Thurgau, territory belonging to Austria, and in the war resulting from this move they were again successful. They secured the cession of these regions by a treaty in 1460. Freiburg and Solothurn were admitted into the confederation in 1481, as the result of a successful war against Charles of Burgundy. Emperor Maximilian I, of Austria made a final attempt to bring the Swiss into subjection by invading their territory in 1498, but met with defeat in six desperate battles, and the Peace of Basel of 1499 gave Switzerland practical independence, though international sanction was not secured until 1648. The three cantons of Basel, Schaffhausen, and Appenzell were long sympathetic and active allies to the confederation, and the two former were annexed in 1501 and the latter in 1513, thus bringing the number of cantons up to thirteen.

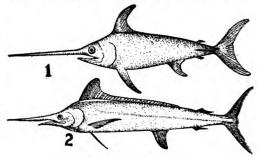
Zwingli began to preach the Reformation at Zürich in 1518, and his religious tenets were adopted by that canton in 1523, while Bern and the other cantons in the north soon followed, though the forest cantons remained attached to Catholicism. In 1531 war broke out between the two factions and Zwingli was slain at the Battle of Kappel. The work of the Reformation was soon taken up by Calvin at Geneva, but severe struggles and internal dissensions prevailed for several centuries. The aristocracy gained considerable influence in the larger cantons, but the Protestants secured a final victory, in 1712, at the Battle of Wilmergen. Public thought began to turn toward internal development soon after, resulting in the construction of canals, the building of cities and schools, and the development of a national spirit, law, and literature. The French seized Switzerland in 1798, when a number of cantons were added, but the peace of 1815 again restored independence and brought the number of cantons up to 22. This treaty was made at Vienna and declared the perpetual neutrality of Switzerland and parts of North Savoy under the guarantee of the great powers, who pledged themselves to maintain Swiss independence. The order of Jesuits was expelled in 1847, and the following year a number of disturbances occurred as a result of the Revolution of 1848 in France. This resulted in the adoption of the constitution of 1848, which forbade many monastical practices in Neuchâtel and other cantons.

The present constitution of Switzerland is a revision made in 1874 and was formally adopted on April 19 of that year. It accords greater power to the federal authorities, guarantees a larger scope of political rights to the citizens, and extends the suffrage. The 600th anniversary of the Swiss republic was celebrated in 1891, thus giving it the proud distinction of being the oldest of existing governments based directly upon democracy and the common rights of all.

Switzerland has made material progress in its commercial and industrial life since the latter part of the 18th century, and the government is continually exercising its offices to extend its commercial and material importance. Although the history of the country has been comparatively uneventful the past century, it has been marked by a steady intellectual and national growth. In 1908 the federal council prohibited the manufacture and sale of absinthe. Reforms in labor laws and insurance for the working classes were adopted about the same time.

SWORD, a weapon of offense or defense, used either as a dagger or like a large knife. It is made of a long steel blade fitted with a handle large enough to grasp with one hand, and, in some cases, with both hands. The blade is larger than that of the dagger or poniard, but it is not mounted on a long handle or staff. In the English language the name sword is applied to both the straight and the curved weapon, but in German the former is known as Degen and the latter Sabel, while the general name is Schwert. The length of the blade varies from 30 to 35 inches, which is about the length of a saber, a weapon used extensively in the cavalry of the United States for cutting and thrusting. However, some military organizations carry a saber with a curved blade intended only for cutting. Formerly the sword was used extensively, but it went rapidly out of use after the invention of modern weapons of war. Swords made of bronze and later of iron were used in ancient Greece. Tempered steel was used in making the straight swords employed in Rome at the beginning of the Christian era.

SWORDFISH, a family of spiny-rayed fishes, allied to the mackerels. They attain a length of fifteen feet and have the bones of the



1, Swordfish; 2, Spearfish.

upper jaw consolidated to form a long, swordlike process. Swordfish are widely distributed in the open seas of tropical and subtropical climes, and, being quite strong and swift, the larger species are rarely captured. The ventral fins are absent and the dorsal fin is high, without distinct spines. Only a few species are known. Most of those caught have a bluishblack color above and silvery-white beneath. They pursue schools of mackerel and other

fishes, and feed on them with great greed. The swordlike projection forms about three-tenths of their length and is used as a weapon with which to attack other fishes. They have been known to pierce the timbers of ships with these projections and to kill large-sized whales. Young swordfish are considered good food, both fresh and salted, but when older the flesh becomes less palatable. These fishes are abundant off the Atlantic shore of North America and in the Mediterranean, and in the latter are harpooned by fishermen of Sicily and Naples. Those native to the Mediterranean are generally spoken of as the common swordfishes. They attain a length of ten to twenty feet.

SYBARIS (sĭb'är-ĭs), a city of the ancient Greeks in Lucania, in the southern part of Italy. It was situated on the west shore of the Gulf of Tarantum, between the Crati and the Coscile rivers, a short distance from the sea. The Achaeans founded it about 720 B. C., but other nationalities were permitted to take part in its government. According to Strabo, the city reached its height of prosperity about the year 500 B.C., when it ruled over 25 subject cities and sent an army of 300,000 men into the field. It carried a large trade with centers in Europe and Asia Minor, but finally fell into the hands of Telys, a tyrant supported by the popular party. The Crotonians destroyed the city while it was in the height of its prosperity and turned the bed of the Crathis (now Crati) over the site. In 1879 extensive excavations were made to determine the exact location of several large buildings, but little of value was brought to light.

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SYCAMORE (sik'a-mor), the name applied to a species of maple trees. It occurs in abun-



SYCAMORE MAPLE, Flower and Seed.

dance in the west central part of North America, especially in Ohio and Indiana, where it is frequently called the *plane tree*, or *buttonwood*. The leaves are broad and the bark is white. Sycamore is properly the name of a large tree

native to Syria and Egypt, which is allied to the common fig. This tree yields a small fruit which is used extensively in Egypt for food, and the wood, though light and soft, is very durable, having been used for the coffins of mummies. The fruit is top-shaped, well flavored, and somewhat aromatic. Trees of this species are widespreading, the top often occupying a space forty yards in diameter. They are planted near villages and along highways for shade and ornamental purposes.

SYDNEY (sĭd'nĭ), a seaport city of Australia, capital of New South Wales, the oldest city in that continent. It occupies a convenient site on Jackson Bay, an inlet from the Pacific Ocean, on which it has a large and well-improved harbor. An extensive system of railroads furnishes communication with the regions lying inland, thus giving the city important domestic and foreign trade advantages. The streets are regularly platted, intersecting each other at right angles. It has stone and macadam pavements, waterworks, sewerage, and adequate means for rapid transit. Among the notable buildings are the post office, the government house, the parliament building, the customhouse, the Cathedral of Saint Andrew (Anglican), the Cathedral of Saint Mary (Roman Catholic), the National Art School, and the public library. It is the seat of the University of Sydney, several hospitals, and a number of industrial institutes. Hyde Park is one of several fine public grounds.

Sydney is important as an industrial center. It has large flouring mills, lumber yards, grain elevators, and railway shops. The manufactures include machinery, glue, leather, cured meat, vehicles, boots and shoes, sugar, paper, furniture, hardware, glass, pottery, steam engines, and clothing. It has a large export trade in coal, preserved meat, wool, wheat, copper, hides, tallow, and tin. The imports include coffee, tea, cotton, wearing apparel, and colonial goods. The place was founded in 1788. It was named in honor of Viscount Sydney, then colonial secretary. Its prosperity dates from 1851, when gold was discovered in the region lying inland, but it has been largely augmented by railroad building and the establishment of manufactures. Population, 1901, 487,903; in 1911, 629,503.

SYDNEY, a city of Nova Scotia, county seat of Cape Breton County, 200 miles northeast of Halifax. It is situated on Cape Breton Island and the Intercolonial Railway, and in the vicinity are extensive coal mines. The harbor is safe and commodious. It is the terminus of lines of steamers with Halifax and other cities. The industries include meat packing, machine shops, shipbuilding, and steel and iron works. Among the noteworthy buildings are the public library, the county courthouse, the high school, the Sydney and the Grand hotels, and a number of fine churches. Electric lighting, waterworks, and sewerage are among the public utilities. Population, 1916, 18,840.

SYLLOGISM (sĭl'lô-jiz'm), in logic, the principal method of deductive inference, that is, an inference from the general to the particular. It contains three terms, the subject and the predicate of the conclusion, and a term called the middle term, which occurs in both premises. The syllogism has three propositions, namely, two premises and a conclusion. The premise containing the major term is called the major premise; the major term is the predicate of the conclusion. On the other hand, the premise containing the minor term is called the minor premise; the minor term is the subject of the conclusion. The following arrangement is in the regular form of deductive reasoning:

All men are mortal. John is a man. Hence, John is mortal.

It will be seen that the first two propositions, called the premises of the reasoning, or syllogism, make the proof of the third, while the third proposition, called the conclusion, is the point to be proved. The arrangement may be expressed in the formula: "M is P, S is M, therefore S is P." Premises may be negative as well as affirmative, that is, S is not P, as well as S is P, and they may include either all or a part of the subject, as some S is P, or some S is not P. From these we have the four cardinal propositions:

Universal affirmative: All S is P. Universal negative: No S is P. Particular affirmative: Some S is P. Particular negative: Some S is not P.

The four cardinal propositions, as a matter of convenience, are designated by the four first vowels: namely, A, universal affirmative; E, universal negative; I, particular affirmative; O, particular negative. In combining these four propositions in all the possible ways of three in a set, we obtain 64 sets, which are called moods. However, only eleven of these moods give valid conclusions, namely, AAA, AAI, AEE, AEO, AII, AOO, EAE, EAO, EIO, IAI, and OAO. Every mood of the syllogism has four figures. In the first figure, the middle term is the subject of the major premise and the predicate of the minor; in the second, the middle term is the predicate of both premises; in the third, it is the subject of both premises; and in the fourth, it is the predicate of the major premise and the subject of the minor. Since each of the eleven moods has four figures, it follows that there are 44 syllogisms, but of these only nineteen are found by examination to be distinct and valid.

When one of the premises is understood but is not expressed in the statement, the syllogism is called an enthymeme. When several premises are employed for the same conclusion, several syllogisms are in fact abridged into one formula, which is called a societas. When one premise is assumed as hypothetically true and the conclusion is stated as depending upon the truth of the other alone, we have what is called a conditional

judgment. On the other hand, if the conclusion is stated as depending upon the falsity of the other, we have a disjunctive judgment. the fulfillment of all the conditions of the formulas in syllogisms, it is necessary to observe certain conditions and laws in regard to the use of words, this being necessary to the validity of the reasoning. A violation of these laws gives rise to fallacies.

SYLVESTER, the name of two popes and an antipope. Sylvester I. was elected Pope in 314 and governed the church during the reign of Constantine I. He sent two legates to represent him at the Council at Nicaea and exercised much influence over the emperor. He died in 335, having served about 21 years. Sylvester II. became Pope in 999, at the advanced age of 64 years, and died in 1003. His name is associated with progress in scientific studies, especially in astronomy, mechanics, and mathemat-The superstition of the times caused people to look upon him as a magician, and there was a popular belief that his soul had been sold to Sylvester III. was the antipope of Satan. Gregory VI., but was deposed in 1046 by the Synod of Sutri. See Pope.

SYMBOL (sim'bol), a sign or representation of an idea, used to suggest a quality, operation, or name. Symbols are used in mathematics to represent a quantity or an operation, or to express relationship between two or more quantities. In chemistry, symbols are abbreviations standing for the name of an element, and consist of the initial letter of the Latin name, or sometimes of the initial letter of the name of an element. Astronomical symbols are used to indicate the signs of the zodiac and the phases of the moon. For instance, o indicates new moon; 3, the first quarter; @, full moon; and &, the last quarter. See Arithmetical Signs; Chemistry; Zodiac.

SYMMES (sīmz), John Cleves, eminent pioneer, born on Long Island, New York, July 21, 1742; died in Cincinnati, Ohio, Feb. 26, 1814. In 1787 he formed an association to colonize a large tract of land along the Ohio and Miami rivers, for which purpose he obtained a grant of 1,000,000 acres of land. The first settlement was made by a company from New Jersey, which settled the town of Losantiville, but the name was later changed to Cincinnati by Governor Saint Clair. Symmes failing to colonize all the land granted, the tract was reduced to 238,540 acres. The Symmes purchase, as the tract was called, was instrumental in causing the passage of the first preëmption law in 1801.

SYMMES, John Cleves, soldier and lecturer, nephew of the former, born in New Jersey in 1780; died May 28, 1829. After serving with success in the War of 1812, he settled at Newport, Ky., where he devoted himself to lecturing and literary work. He announced the remarkable theory that an enormous opening, called Symmes' Hole, exists at 82° north latitude and that it communicates with the earth's interior. Several writings published by him maintain that the interior of the earth forms a large hollow space, which may be inhabited, and that this region may be reached by descending the Symmes' Hole. His chief work is entitled "Theory of Concentric Spheres."

SYMONDS (sim'undz), John Addington, historian, born in Bristol, England, Oct. 5, 1840; died in Rome, Italy, April 19, 1893. He graduated from Oxford University and in 1862 was made fellow of Magdalen College. His first writing to attract attention is an "Introduction to the Study of Dante," in 1872, and four years later he published "Studies of the Greek Poets." The most noted of his publications is "Renaissance in Italy," a work of seven volumes, on which he labored a period of eleven years. This work appeared in five parts, bearing the titles, "Revival of Learning," "Age of Despots," "Fine Arts," "Italian Literature," and "Catholic Reaction," the last two mentioned containing each two volumes. The last twenty years of his life were spent at Davos Platz, a health resort in Switzerland, where he wrote his later works. These include "Life of Shelley," "Our Life in the Swiss Highlands," "Wine, Woman, and Song," "Autobiography of Benvenuto Cellini," and "Shakespeare's Predecessors in the English

SYNAGOGUE (sĭn'à-gŏg), a place of meeting for Jewish worship and religious instruction, which corresponds to a church used by Christians for a like purpose. Jewish worship of the highest type was limited by the Mosaic law to the divinely chosen Jerusalem, but gatherings were held in various localities, even in the early period of the monarchy. When the Israelites were exiled in captivity to Babylonia, they constructed synagogues in different places, but always so they had their faces turned toward Jerusalem when entering at the door and when praying. Buildings of a similar character were constructed after the return from captivity and soon dotted all the inhabited parts of Palestine. Many synagogues were maintained in the time of Christ. It is mentioned specially in the Bible that Jesus taught, preached, and wrought miracles in the synagogue of Capernaum. The apostles found synagogues in various places not located in Palestine, including those in the cities of Damascus, Iconium, Thessalonica, Athens, Corinth, and Ephesus.

The synagogues were formerly built with a partition five to six feet high, on one side of which sat the men and on the other side the women. Special seats were provided for the scribes and Pharisees at the eastern end, and the buildings were constructed so the congregation faced the east. A platform was provided for the speaker or preacher, and near it was an ark containing Hebrew copies of the Books of Moses. Though regular rabbis, or preachers, were appointed, others present could be called

to address the congregation, and this privilege was extended even to strangers. Synagogues of modern construction are built quite similarly in eastern countries, but in most European and American countries they resemble more nearly the Christian churches. Ezra founded a Jewish council after the Babylonian captivity, known as the *Great Synagogue*. It consisted of 120 members. The purpose was to remodel the religious life and collect the sacred writings of the Jews. See Sanhedrim.

SYNCHRONOGRAPH (sĭn'krō-nō-grāf), an apparatus used in telegraphy for the rapid transmission of signals. A metallic disc is mounted on an axis, either the same or another axis than that on which the generator is mounted, and an alternating electric current is supplied to the disc through a brush. A tape that passes between the disc and the brush opens and closes the current. This instrument is used in connection with machine telegraphy, and the number of words transmitted per minute is very high, ranging from 2,000 to 3,500.

SYNOD (sĭn'ŭd), an ecclesiastical councilor assembly for mutual deliberation on matters of general interest, affecting the churches within its jurisdiction and designed for their guidance. The term is used by the Lutheran Church in the United States to describe a supreme council, known as the general synod, and a more limited one known as the district synod. It is similarly used by the Dutch and German Reformed churches, but the Presbyterians apply it to a council immediately between presbyteries and general assemblies. In this sense the term applies to a body composed of presbyteries or delegates from them. In the Presbyterian Church an appeal may be taken from the presbytery to the synod and from the synod to the general assembly

SYNTAX (sĭn'tăks), the division of grammar which treats of the construction of sentences. The rules which govern in syntax differ according to the established usage and the languages to which they apply. In the English, which has few inflections, a large diversity of arrangement is not possible, the principle of juxtaposition being applicable to a large extent. In such languages as the Latin and German, which have a large number of inflected words, the relation of the principal elements of sentences can be indicated by changes in the forms of certain words, and the form of construction can be variegated. The correct placing of elements is called arrangement, which may be either in the natural or the inverted order. The either in the natural or the inverted order. natural order of arrangement is that which is most customary, while the inverted order is any departure from the natural order of arrangement. However, the construction of sentences or parts of sentences is governed by the logical relations of the thoughts which are expressed. The construction of sentences from words is known as synthesis.

SYNTHESIS (sĭn'thē-sĭs). See Analysis. SYRA (sē'rā), or Syros, an island of the Cyclades, situated in the Aegean Sea, 20 miles northwest from Paros. The area is 31 square miles. Formerly it had forests of considerable value, but they have been largely cut and the island has been denuded of its fertility. Hills and narrow valleys characterize the surface. It is the site of Hermopolis, the capital of the monarchy which includes the Cyclades, and is an important seaport of Greece. This city is located at the head of a bay on the eastern coast, near the site of the ancient city, and has a population of 27,350.

SYRACUSE (sĭr'a-kūs), a city of New York, county seat of Onondaga County, 148 miles west of Albany, on Lake Onondaga, 35 miles south of the east end of Lake Ontario. Direct communication is provided with Albany and Buffalo by the Erie Canal and with Lake Ontario by the Oswego Canal. It has transportation facilities by the New York Central, the West Shore, and the Lackawanna railways. The city is regularly platted, having broad streets that cross each other at right angles, and the location is on a gently rolling site. Fine avenues of trees shade the chief residential streets, and these are beautified by parkings and pavements. Many small parks are located in different parts of the city. On the eastern border is Lincoln Park, a wooded tract of 20 acres, and Burnet Park, including about 100 acres, is located on a

hillside in the west. Syracuse is the seat of the

State Fair, which is under the management of

the State Agricultural Society.

The architecture is substantial, chiefly of brick and stone. Among the important buildings are the county courthouse, the city hall, the Carnegie Library, the post office, the high school, and the buildings of the Syracuse University. It has a number of hospitals and charitable institutions, including the County Orphan Home, the Old Ladies' Home, and the State Asylum for Feeble-Minded Children. Besides the public library of 65,500, it has a fine library in the public schools and a law library belonging to the State. Intercommunication is by an extensive system of electric railways, with which are connected lines that extend to other cities and various points within the State. The waterworks are owned by the municipality. Other utilities include electric and gas lighting, sewerage, and storm water drainage. Many of the streets are paved with stone and asphalt, the latter being used chiefly in the residential section.

Syracuse ranks as the fourth city of the State and is noted as a commercial and manufacturing center. Springs on the border of Lake Onondaga yield large quantities of salt by evaporation, and large quantities are manufactured for exportation. It has establishments for the manufacture of clothing, typewriters, flour and grist, boots and shoes, iron and steel, and agricultural imple-

ments. Other manufactures include soda ash, carbolic acid, tar, ammonia, jewelry, and glassware. It has a large wholesale and export trade and is important as a market for live stock and farm produce.

The Onondaga Indians formerly occupied the region in the vicinity of Syracuse. Isaac Jogues, a Jesuit missionary, visited the locality in 1642. An Indian trading post was established in 17% and it was soon afterward named Salt Point, from the large salt deposits in its vicinity. The completion of the Erie Canal caused it to grow rapidly, and it was incorporated as a village in 1825. Several villages were united in one corporation in 1847 and named Syracuse. Since then its commercial and educational growth has been constant. Population, 1910, 137,249.

SYRACUSE, an ancient city of Sicily. It was once the most noted commercial center of Southern Europe, but now is greatly reduced in size and importance. The ancient city occupied a large and imposing site on the east coast of the island, measuring fully 22 miles in circumference, when it probably contained fully 750,000 people. The city was founded by Corinthian colonists in 734 B. C., and the Greek Thucydides speaks of it as having been greater than any Grecian city, not excepting Athens. It rose to commercial importance with great rapidity and. after being strongly fortified by four walls, became a stronghold of strategic importance. Colonists were sent from Syracuse to various countries bordering on the Mediterranean. Among its famous rulers were the Elder and the Younger Dionysius, Hiero I., and Hiero II. It successfully repulsed the besieging Athenians in 413 B.C., but the Romans conquered it after a three years' siege in 212 B. C., and subsequently it remained identified with Rome until the decline of the empire. The Saracens captured and pillaged it in 878 A.D., carrying away its treasures, and it soon fell into complete decay. Among the famous buildings of ancient Syracuse were the Agora temple of Zeus Olympius, the Prytaneum, and a theater with a capacity for 24,000 people. In the Prytaneum was a splendid statue of Sappho. The city contained elaborate monuments built to Dionysius the Elder and Timoleum. The ancient harbor was the scene of great naval activity, and traces of its vast extent and improvements still remain.

The modern city of Syracuse is partly on the main island of Sicily and partly on a small island near the shore. The latter is known as Ortygia and is about one mile long and half a mile wide. Most of the streets are narrow and in an unwholesome condition, but it has several fine buildings, including a cathedral, a museum of classical antiquities, and numerous churches, monasteries, and numeries. The city has a public library and several secondary schools. Among the manufactures are earthenware, drugs, chemicals, wine, and textiles. It has considerable trade in salt fish, wine, salt, oil, and silk textiles.

A railroad line extends from it along the eastern shore of Sicily, and other lines furnish communication with the interior. Population, 1916, 32.894.

SYRACUSE UNIVERSITY, a coeducational institution at Syracuse, N. Y., founded under the auspices of the Methodist Episcopal Church in 1870. It is the successor of Genesee College, which was conducted at Lima, N. Y., from 1849 until 1871. The five colleges of the university include those of liberal arts, fine arts, medicine, law, and applied science. The master's and doctor's degrees are conferred in the graduate department. Besides the regular departmental work, the university maintains a summer session of six weeks and conducts a line of work at the marine biological laboratory at Wood's Hole, Mass. Lectures on meteorology and climatology are given in connection with the observing station of the United States Weather Bureau. The faculty includes about 290 professors and instructors, and the attendance is 3,800 students. The university has a library of 90,000 volumes and property valued at \$3,500,000.

SYR-DARYA (sĭr där'ī-ä), or Sir-Daria, a river in the western part of Asia, chiefly in Russian Turkestan. It rises in the Tian Shan Mountains of Chinese Turkestan and flows toward the northwest into the Aral Sea. The total length is 1,500 miles. In the upper part it is known as the Narin, where it has many rapids and forms a mountain torrent. The lower course is through an arid region, where a large part of its waters are evaporated during the dry season. Anciently

this river was called Jaxartes.

SYRIA (sĭr'ĭ-à), a political division of Turkey in Asia, forming the coast region along the eastern shore of the Mediterranean. It is bounded on the north by the Taurus Mountains, east by the Euphrates, the Syrian Desert, and Arabia, south by Arabia and Egypt, and west by the Mediterranean. The area is estimated at 108,625 square miles. Population, 1916, 3,518,950.

DESCRIPTION. The region along the shore is mostly sandy, with shallow coastal indentations, but the coast plain narrows toward the north, where Mount Carmel and the Lebanon Mountains occupy the region near the shore. Between the Lebanon and the Anti-Lebanon is the extensive valley of Coele-Syria, through which flows the Orontes River. It receives several confluents and discharges into the Mediterranean at Seleucia. Ranges of mountains traverse the interior in lines almost parallel to the coast. They reach the greatest height in the Lebanon Mountains, which tower from 8,000 to nearly 11,000 feet above sea level. A portion of the Coele-Syria valley is drained by the Leontes River, which flows into the Mediterranean, but the southeastern part lies in the Jordan basin, which has a general inclination toward the south and drains into the Dead Sea. Syria contains considerable tracts of grazing lands, but large parts of it are highly fertile, especially the valleys of Lebanon and the plains of Gaza, Sharon, and Esdraelon. Minerals are not particularly abundant, but there are paying deposits of coal, iron, salt, bitumen, quicksilver, and limestone.

Tourists notice a peculiar ab-INDUSTRIES. sence of skill in cultivating the soil, an art anciently of great renown in that region. However, within recent years the agricultural art has been showing evidences of improvement, owing largely to the building of several railroads and the return of many Jews to Jerusalem. The principal soil products include hemp, cotton, wheat, barley, rice, tobacco, indigo, and fruits. The chief fruits grown are olives, grapes, and apples. Sheep and cattle raising are important industries in the grazing and mountain regions, while the mixed farming in the fertile districts includes the rearing of horses, camels, and poultry. Silk culture is making considerable advancement and is keeping pace with the development of mulberry groves. The cedar of Lebanon, so famous in history, is still secured, and the country has several species of pine and deciduous trees. The climatic conditions vary greatly in different sections, ranging from cool and pleasant summers in the Lebanon region to the arid and hot seasons in the Jordan valley. From April to October a dry season with scarcely any rain occurs. Syria has been divided by the Turks into several governments and industrial activity is fostered by them to a limited extent. It has few good highways. The manufactures embrace The manufactures embrace soap, earthenware, silk goods, cotton and woolen textiles, jewelry, glass, and clothing.

LANGUAGE, RELIGION, AND LITERATURE Syriac dialect is a branch of the Aramaic tongue and belongs to the Semitic family of languages, but the official and general language spoken is Arabic. About four-fifths of the people are Mohammedans, and the remainder are Christians and Jews. The Christians comprise Protestants and Greek and Roman Cath-Protestant missionaries are actively at work through American and European assistance and a college is maintained by them at Beyrout. Protestant and Catholic schools and churches are supported in Jerusalem and many other cities. Syriac is practically a dead language, but it is used as the sacred language among the Christian churches of Syria and Asia Minor, especially in the Greek and several allied churches.

The literature written in the Syriac is classed with the Christian writings and had its rise in the 1st century of our era. Many of the early

the 1st century of our era. Many of the early writings are translations and commentaries on the Bible, and they contain many sacred hymns. liturgies, and prayers. The first complete translation of the Bible into Syriac, called the

Peshito version, is of great value to scholars. Works in philosophy, history, grammar, nat-

ural sciences, law, and medicine date from the 4th century A. D., but many of these writings are not extant, though it is known that they exercised an important influence in bringing classical learning to the Arabs. Among the Syriac writers of note is Saint Ephraem of the 4th century. The later writers include Jacob of Edessa, Bar-Habraeus, and Bar-Ali.

HISTORY. The history of Syria dates from remote antiquity. Damascus was a city of importance in the time of Abraham, about 2000 B. c., but about 740 B. c. the Assyrians conquered it and made Syria tributary. The coast region west of the Lebanon Mountains was occupied by the Phoenicians, who founded and defended the powerful commercial cities of Sidon and Tyre, but they, too, became at least partially tributary to Assyria. Other peoples of note include the Moabites, Canaanites, Ammonites, and Anakims, who occupied the region along the Jordan. The Israelites under Joshua invaded Palestine about 1500 B, c. and held the country with varying success until about the time of Christ, when it became a part of the domain of the Romans. In the meantime the Israelites were carried into Assyrian captivity, in 721 B. c., and later into Babylonia.

Syria was conquered by the Persians and subsequently by the Greeks under Alexander the Great. After the division of Rome it was a part of the Byzantine Empire, but in 636 A. D. the Arabs conquered it. The Seljuk Turks occupied it in 1078 and later it was held by the Crusaders, who maintained their kingdom at Jerusalem until 1187. The Mamelukes joined it to Egypt, but it finally became a territory of the Ottoman Turks in 1517. Mehemet Ali conquered it in 1833, but the great powers of Europe restored it to the Turks in 1840. The Druses and Maronites began a factional war in 1860, which the Turks were unable to quash, but peace was restored under European sanc-

tion by a French military force. The region is now divided into three governments. One has its capital at Beyrout and one is governed from Damascus. The region of Lebanon is governed by a Christian mutessarrif from Beit-ed-din.

SYRIAN CHRISTIANS, a branch of the Christian Church, officially called the Church of the Syrian Rite. It is most strongly represented in Syria, but controversies in the 4th century caused it to be divided into numerous denominations. The leading branches include the Jacobites in Mesopotamia, the Maronites in Lebanon, the Nestorians in Kurdistan, and the Christians of Saint Thomas in India. In the 4th century this church had several million members and was a united body, and the total membership at present does not exceed that number.

SZEGEDIN (sěg'ěd-ēn), a city of Hungary, at the confluence of the Maros and Theiss rivers, 105 miles southeast of Budapest. It is an important railroad junction. The surrounding country is fertile, producing large quantities of corn, tobacco, and fruits. It has manufactures of soap, matches, leather, tobacco products, salt, soda, cotton and woolen goods, machinery, and lumber products. The principal buildings include the government offices, the superior law court, numerous public and secondary schools, and several convents and churches. Szegedin has a large railroad and river commerce, the articles of trade being manufactures, live stock, cereals, and lumber. The city stands in a marshy plain and is defended by a fortress built by the Turks in the 16th century. An overflow of the Theiss River caused much damage in 1879, but since then vast embankments and wharf improvements have been made to protect against high water. The inhabitants consist almost entirely of Magyars and Slavs. Population, 1916, 126,643.



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TABERNACLE

T, the twentieth letter and the sixteenth consonant of the English alphabet. It is a sharp mute and is closely associated with d, the two being frequently interchanged in some languages. In German it is quite similar to z, as in Pestalozzi. It is made by placing the tip of the tongue closely against the front part of the palate and then giving a quick and strong emission of the breath. In some words, as in nation, action, and portion, it has the sound of sh. It is silent in some words, as in castle, listen, and christen.

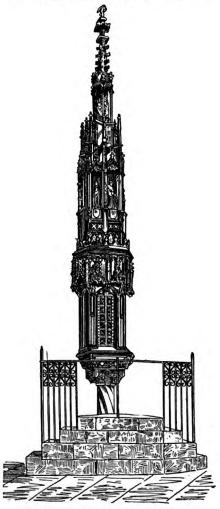
TAAL (tä'al), a town of the Philippines, in Luzón, on the Transipit River, near the Gulf of Balayán. It is connected by a bridge with Lemeri, on the opposite side of the river, and is about fifty miles south of Manila. Formerly the town was located on the bank of Taal Lake, in which the volcano Taal is situated, but numerous eruptions caused it to be removed farther south. It has a large trade in cotton, sugar, coffee, and fish. Population, 1918, 33,550.

TABARD (tăb'erd), a kind of tunic or mantle worn as a protection from the weather during the Middle Ages. Usually it was worn over the armor, when it was decorated with the arms of the wearer. The name Tabard was applied to an inn of London, England, in the 14th century. It was located on High Street, Southwark, and was the starting place for the pilgrims mentioned by Chaucer, when they went upon their journey to the shrine of Thomas à Becket. The sign of the inn was a

tabard, or sleeveless jacket.

TABERNACLE (tăb'er-na-k'l), a tent or sanctuary constructed under the direction of Moses in compliance with divine authority. The tabernacle was used while the Israelites were in the desert as a sign that God dwelt among his people. Freewill offerings were solicited to obtain materials for its construction, and in response the Jews brought precious stones, gold, silver, skins, cloth, spices, and other material. It was built in the form of a parallelogram, 45 feet long, 15 feet wide, and 15 feet high. The material was acacia or shittim wood, including 48 boards, of which 20 boards were on the two sides toward the north and south, while six boards were on the west end, and only two on the east end, thus leaving an opening toward the east. Golden rings were used to fasten the upright boards together, while the ends were set into silver sockets, and the upper covering was made of carpet. A court 75x150 feet surrounded the tabernacle, and in the eastern half of the court was an altar for burnt offerings. Between the altar and the tabernacle was a laver or basin used by the priests to wash their hands and feet before passing into the sanctuary, its entrance being covered by a costly curtain which contained woven figures of cherubs. The interior of the tabernacle was divided by a curtain into two compartments, the outer called the sanctuary and the inner the holy of holies. Near the center of the sanctuary was the altar of incense, on which incense was burned by the high priest each morning and evening, while toward the north side was the gilded table of showbread, and in the southern part the golden candlesticks or candelabra. The holy of holies contained a gold-plated and gold-lined box of acacia wood, called the ark of the covenant, and in it were the ten commandments written on two tables. The ark of the covenant was surmounted by the two cherubs and between them was the Shekinah, a figure to symbolize the presence of Jehovah.

The people gathered in the east end of the court to worship, while only the priests entered the sanctuary, and this but twice daily. in the morning to extinguish the lights and in the evening to light them. The holy of holies was entered by no one but the high priest, who went into it but once a year, on the great day of atonement. When the Israelites moved from place to place, the Levites took charge of the tabernacle. Moses first set it up on the first day of the second year after the exodus from Egypt. It was located at Shiloh soon after the Israelites reached Canaan, but in the time of Saul it was at Nod, and when Solomon became king it was at Gibeon. The temple of Solomon superseded it, but that king provided a place for it in the temple, thus making Jerusalem the central place of Jewish worship. The feast of the tabernacle was one of the three leading Jewish festivals, and its celebration required the presence of all the males at Jerusalem, held to commemorate tent life in the wilderness, and on this occasion the people dwelt on their housetops or in temporary dwellings. In the later period the feast partook of thanksgiving for the completion of the harvest and the



TABERNACLE AT BARTFELD, HUNGARY.

vintage. In the latter sense it was called the feast of ingathering. This festival was held in autumn, lasting eight days, the first and eighth days being holy convocations.

In the Roman Catholic Church, a tabernacle is a receptacle in which to retain the Eucharist. Some of these structures are finely ornamented with metal and marble. Bartfeld, Hungary, has a noted tabernacle of this kind.

TABLELAND. See Plateau.

TABLE MOUNTAIN, or Tabelberg, a mountain of South Africa, in Cape Colony, situated near Cape Town. It has an elevation of 3,560 feet. The summit furnishes a fine outlook across the city and Table Bay. It is so named on account of its peculiar shape and level top. White clouds, termed tablecloth, fre-

quently envelop the summit.

TABOO (tà-boo'), the name applied by the natives of the Polynesian Islands to any object which is consecrated for a special religious purpose. In some instances they extend the name to certain political prohibitions exercised by the chiefs. All things reserved for their idols are taboo and no one but the priests is permitted to touch them. The prohibition is especially incumbent upon women and such men as are regarded profane. Formerly the chiefs were accustomed to taboo certain articles of food and clothing, especially those they desired to reserve for their own use, and this practice occasioned distress by depriving the common people of what belonged to them. The word is now used to signify a total prohibition of intercourse with or approach to the thing tabooed.

TABOR (tā'bēr), Mount, a famous mountain in northern Palestine, rising abruptly in the plain of Esdraelon to a height of 1,900 feet. It furnishes a magnificent view of the Holy Land. From its summit the tourist may catch a gleam of the Sea of Galilee fully fifteen miles distant, while the adjacent plains and a large part of the Jordan basin may be viewed. Fine forests of oak and pistacias grow on its slopes and summit, in which wolves, lynxes, and reptiles find a haunt or retreat. Tabor was long thought to be the scene of Christ's transfiguration, but it is now reasonably clear that that event occurred farther north and that a fortified city occupied the region in its vicinity for centuries. The Crusaders built many fine churches and monasteries on Mount Tabor and traces of them still remain. Napoleon I. gained a victory over the Turks on its slopes.

TABRIZ (tà-brēz'), or Tabreez, a city of Persia, capital of the province of Azerbijan, on the Aji River, 38 miles east of Lake Urumiah. It occupies a fine site 4,000 feet above sea level, is fortified by a brick wall with an outer ditch, and may be entered through seven gates. Lofty hills surround three sides of the city, while the other side is in the form of a fertile and extensive plain. The city is well platted and cleaner than most cities of the East, but many of the buildings are poorly constructed and lighted, and little provision has been made for sanitary comforts. Among the manufactures are jewelry, carpets, silk and cotton goods, leather, furniture, earthenware, and uten-The leading exports include shawls, spices, dried fruits, carpets, and raw silk, and there are imports of sugar, wines, and fabrics. It has a large interior and foreign trade and is the gathering center of many caravans. Among the principal buildings are numerous mosques and bazaars, an arsenal, several baths, and a number of government houses.

Tabriz is the Tauris of ancient times and is

one of the oldest cities of the East. Tiridates III. made it the capital of Armenia in 297 A. D., when it was considered an old city. The site was enlarged and beautified by parks and gardens under the direction of Zobeidah, wife of Harun-al-Raschid, in 791. In 1293 Marco Polo made a visit to Tabriz. Timour sacked the city in 1392 and soon after it became a possession of the Turkomans, but fell to the Persians in 1500. Earthquakes are of frequent occurrence, which accounts for most of the buildings being low. A large per cent. of the inhabitants are of Turkish descent. Population, 1916, 180,500.

TACITUS (tăs'ī-tŭs), Publius Cornelius, Roman historian, born about 55 A. D.; died probably in 117. Little is known of his early life, but it is thought that his father was Cornelius Tacitus, a Roman eques, or horseman. He was first appointed to office by the Emperor Vespasian. Titus raised him to the rank of questor and Domitian made him pretor in 88, while under Nerva he succeeded to the office of consul. Previous to that, in 78, he had married the daughter of Caius Julius Agricola, the latter dying in 83 while both Tacitus and his wife were absent from Rome. Tacitus succeeding to the office of consul under Nerva, in 97, as successor to T. Virginius Rufus, he delivered his famous funeral oration at the tomb of the latter. He and the younger Pliny were intimate friends, and this circumstance caused the former to write eleven letters, in which much valuable history and incidents of public life are treated. Among his numerous historical writings are "Life of Agricola," a mas-terpiece of noble sentiment; "Annals," a work in sixteen volumes covering the period of Roman history from the death of Augustus, in 14 A. D., to the death of Nero, in 68 A. D.; "History," including five volumes that cover the period from the consulship of Galba, in 68, until the ascension of Vespasian, in 70; and "The German People," a treatise of the geography and history of the Germans occupying the region of the Rhine. Another work of great historic value is his "Dialogue on Ora-tors." The writings of Tacitus are particularly valuable because of his care in aiming to give accurate information. They are characterized by a concise style, close discernment of character, and high moral tone. A number of his works are extant, but some of them have been disfigured by interpolations.

TACOMÁ (tå-kō'må), a city of Washington, county seat of Pierce County, 28 miles west of south of Seattle. It is situated on Commencement Bay, an inlet from Puget Sound, near the mouth of the Puyallup River. The city has transportation facilities by the Northern Pacific, the Great Northern, the Canadian Pacific, the Chicago, Milwaukee and Saint Paul, and other railroads. It has a secure and spacious harbor, from which many steamship lines sail to carry coastwise and trans-Pacific trade.

The site rises gradually from Commencement Bay, which is about a mile wide and five miles long, and the streets traverse an undulating tract. The surrounding country has deposits of coal and extensive interests in lumbering. It produces grain, hops, fruits, and vegetables. Southeast of the city is Mount Rainier, locally called Mount Tacoma, one of the Olympic Mountains. It has an elevation of 14,526 feet and presents a picturesque sight, having forest-covered slopes and a snow-capped summit.

The city is finely platted, having wide and straight streets, many of which are substantially paved with stone, brick, and asphalt. parks include about 700 acres, of which Point Defiance is the most noteworthy, being the largest and beautifully ornamented with natural scenery of great beauty. Among the principal buildings are the county courthouse, the city hall, the Chamber of Commerce, the Northern Pacific offices, the Tacoma Theater, the public high school, the Union Club House, and the Tacoma Hotel. It is the seat of Puget Sound University, the Annie Wright Seminary, the Washington College, the Pacific Lutheran University, the Whitworth College, Vashon College, and the Tacoma Academy. The Carnegie public library contains about 38,000 volumes, and the Ferry Museum of Art contains a choice collection. Among the institutions are the city and county hospitals, the State insane asylum, and the Saint Joseph's Hospital. The municipality owns and operates the waterworks and the electric light plant. Intercommunication is provided by an extensive system of street railways, which is connected with lines that reach Seattle and other points within the State.

Tacoma has a large wholesale and jobbing trade and is one of the leading business centers of the Pacific coast. An abundance of timber and coal is obtained for manufacturing purposes in the vicinity. It has large smelting and shipbuilding interests. The general manufac-tures include furniture, flour and grist, lumber products, hardware, engines, mattresses, earthenware, and machinery. It has a large trade in coal, packed meat, lumber, grain, flour, fish, and fruits. Salmon fishing is carried on extensively on Puget Sound and much of the output is canned for the market. The wharf facilities, grain elevators, and packing estab-lishments are among the largest in the West. The locality was settled in 1868, when Old Tacoma was founded, and New Tacoma was platted the following year. In 1873 the Northern Pacific was completed, and the city of Tacoma was organized in 1874. It became the county seat in 1880. Few cities of America have had a more rapid and substantial growth in wealth and commercial importance. Population, 1900, 37,714; in 1910, 83,743...

TACONIC MOUNTAINS (ta-kon'ik), a range of highlands in the eastern part of New York, extending a short distance across the

border into Vermont and Massachusetts. These mountains trend from the Hudson toward the northeast, assuming their greatest height after they cross the border, and in Vermont merge into the Green Mountains. Mount Equinox, in Vermont, has a height of 3,816 feet, and Greylock, in Massachusetts, is elevated 3,535 feet above sea level. These highlands give rise to the name Taconic System, which includes a series of rocks of a metamorphosed character that predominate in the region.

TACTICS (tăk'tiks), the art of disposing military and naval forces in order for battle, or conducting and arranging troops for action on the scene of war. The term elementary tactics is applied to the instruction in military art, while grand tactics has reference to the maneuvers on the field of battle. Since armies are divided into infantry, cavalry, and artillery, each class has a form of tactics peculiar to

itself.

Artillery has a large field of action and is a powerful instrument in modern warfare. The chief duty is to protect the infantry of its own country and destroy that of the enemy. This it possible from the fact that it has a great range and may mass itself to support the action of the other arms. Although it must cease firing when flanking or changing its position, modern implements permit it to do so with considerable speed and accuracy. Usually a high point is selected with the view of reaching the position of the enemy and at the same time covering effectively the retreat of its own army. Usually the position is concealed on the sheltered side of a hill and the firing is indirect upon the enemy. Officers stationed at convenient points are able to determine the direction and range of the shots, and by signals indicate the same to those who have charge of the gun. Artillerymen are carefully trained and thoroughly familiar with the theory of projectiles, and from extensive practice are able to locate their batteries and direct the fire with great precision. A field army usually has both light and heavy artillery, the former comprising field and horse batteries and the latter guns of position. Mortar and Howitzer batteries are classed as field artillery and are used for curbed and for high-angle fire. Guns of position are of long range. Usually the artillery moves in columns of platoons, but when within the range of firearms it appears only in columns of sections, thus lessening the danger of excessive losses.

Cavalry has the advantage of being able to move rapidly. This branch of the army is employed chiefly to protect the infantry and to obtain information. When the enemy is to be pursued or the infantry is required to retreat, the cavalry is able to be of great service. Though important as a division of the army, its use in the battlefield is limited. On an open plain it is able to advance upon the

enemy, but this cannot be safely done if there is danger of exposure to artillery fire. Since lances and swords are the principal arms, the cavalry is effective only at short range, and the purpose is to make a sudden and vigorous attack. Where two forces of cavalry meet in combat, the conflict sometimes results in a hand-to-hand conflict, but the encounter is usually of short duration. Cavalry attacks are sometimes made upon the artillery, but only where the strength of the enemy is quite well known, and it is the aim to pass to the rear so as to make the attack at the unprotected side of the batteries. Cavalry attacks upon infantry must necessarily be sudden, else the fire of the enemy causes losses and demoralization before the attack can be made effective. The cavalry, like all other divisions of the fighting forces, is aided by the use of flying machines and machine guns, the sizes and forms being adapted to the use desired.

Infantry is usually effective in firing at a distance of 900 yards, but the fire is more decisive at 500 yards. This division of the army can act independently and is able to act more speedily than any other. Usually the movement is in columns to the firing zone, where the line is single or open, this being essential to avoid the destructive effect of a volley. Trenches and embankments are built in long lines, usually parallel to each other at varying intervals, and the men lie upon the ground as they fire upon the enemy. Advances are made rapidly from one embankment to another, and the firing is either in volleys or each soldier fires at will a definite number of rounds. While each division is previously assigned and the plan of battle is carefully mapped out, each man has certain independence in thinking and in acting. A careful outlook is kept for the exposed and weakened positions of the enemy until the climax of battle is reached, which is frequently at a distance of 500 yards. Frequently it occurs that the encounter is at very close range, when the hand grenade and bayonet are used for attack and defense. Although warfare has been greatly influenced by the invention of powerful explosives and rapid-firing guns, the tide frequently turns upon efficiency at close range. According to Meckel, the noted German tactician, "The laurel of victory still hangs on the point of the bayonet."

Naval tactics are concerned with the proper groupings and movements of ships and other naval weapons. It is the purpose of a commander to hold the enemy at every point, and with this end in view he endeavors to break the line of battle formed by the antagonist. Naval tactics are usually classed in two divisions, including torpedo tactics and the handling of ships and weapons, the latter being termed gunnery. Torpedoes and submarine navigation play an important part in modern naval contests and close quarters are usually

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(Opp. Taft)

WILLIAM HOWARD TAFT.

avoided to escape the effect of torpedoes. If an attack is made upon a fleet or coast defenses, the ships sail in an ellipse. A fleet of twelve ships may be divided into three squadrons of four ships each, or the entire fleet may advance abreast, when the arrangement is

termed a line.

The navies are subdivided differently into fleets and each fleet, into squadrons. Usually a squadron consists of from six to twelve ships, and half a squadron is called a division. Two ships of a squadron comprise a section. When the advance is in single file it is said to be in column, and when the movements are diagonal to the line of the ships they are said to be in echelon. The ships must continue in motion in order to keep them under control and they cannot be turned suddenly. impossible to stop a heavy ship moving at high speed in less than a distance several times her length. These facts have made it necessary to formulate plans of movements during battle. The requirements are that the movement be as simple as possible, that changes in speed be avoided, that ships should be grouped according to their characteristics, and that the fleet be concentrated until the attack is made, when it should be in a position to form quickly as directed by the superior officer.

TADOLINI (tăd-ō-lē'nē), Adamo, sculptor, born in Bologna, Italy, in 1789; died in 1872. After studying in the Academy of Bologna, he settled at Rome. He developed remarkable skill in drawing and sculpturing at an orly age and in 1812 gained a prize by exhibiting "Dying Ajax." Other sculptures designed and executed by him include "Abduction of Gany-mede," "Statue of Washington," and "A Bacchante." "The Archangel Saint Michael," a fine marble group, was sold to an American

for \$38,000.

TAFT, Lorado, sculptor, born in Elmwood, Ill., April 19, 1860. After graduating from the University of Illinois, in 1879, he studied art at Paris for three years, exhibiting in the meantime several sculptures in the salons. He established himself in Chicago in 1886, where he soon after became instructor in sculpture in the Art Institute and lectured before university extension classes on painting and sculpture. His works are numerous and many of them have been universally praised for their symbolical beauty. Among the most noted are a statue of Schuyler Colfax, now in Indianapolis, statue of General Grant, reliefs for the Michigan regimental monument on the battlefield of Gettysburg, and decorations for the horticultural buildings of the Columbian Exposition. The last mentioned include the two beautiful groups entitled "The Painting of the Lily" and "The Sleep and Awakening of the Flowers."

TAFT, William Howard, public man, born in Cincinnati, Ohio, Sept. 15, 1857. He was educated at Yale University and in 1880 grad-uated at the law school of Cincinnati College. From 1881 until 1882 he was attorney of Hamilton County, became collector of internal revenue in the latter year, and in 1887 was made

TAGLIONI

judge of the circuit court of Ohio. In 1890 he was appointed solicitor-general of the United States, serving until 1892, when he was made judge of the United States circuit court for the sixth circuit. President McKinley appointed him chairman



WILLIAM HOWARD TAFT.

of the commission to devise and establish civil government in the Philippines, and on June 5, 1900, he was made the civil governor of the islands. In 1903 President Roosevelt named him as successor of Elihu Root as Secretary of War, of which office he took charge in 1904. He was made president of the American National Red Cross in 1905. President Roosevelt sent him to Cuba in 1907 to restore order, at which time a rebellion was in progress on the island, and in the same year he visited Panama, China, Germany, Russia, and other countries of Asia and Europe. In 1908 he was elected President as a Republican, defeating Bryan, his Democrat opponent. He was the Republican nominee in 1912, but was defeated by Woodrow Wilson, receiving only eight electoral votes, those of Utah and Vermont. Subsequently he accepted a professorship at Yale University.

TAGANROG (tå-gån-rôk'), a seaport city of Russia, in the government of Ekaterinoslav, on the north shore of the Sea of Azov. The harbor is too shallow for large ships to land, but they anchor and unload by means of barges within half a mile of the quay. The surrounding country is highly fertile and is penetrated by several railroad lines, thus giving the city a large export trade in corn, wheat, live stock, wool, leather, and dairy products. Among the manufactures are machinery, clothing, cotton and woolen goods, hardware, and earthenware. The fisheries are an important industry, and both fresh and salt fish are transported to the northern markets. Most of the buildings are wooden structures, but there are a number of massive and substantial buildings, including an imperial palace, a Greek monastery, several hospitals, many schools, a cathedral, and a number of other churches. The city was founded by Peter the Great in 1696. It contains a fine monument to Alexander I. Considerable damage was done in 1855 as a result of the Crimean War. Population, 1916, 61,786.

TAGLIONI (tal-yō'nē), Marie, eminent ballet dancer, born in Stockholm, Sweden, April 23, 1804; died in Marseilles, France, April 23, 1884. She was the daughter of Filippo Taglioni, an Italian ballet master, and under his guidance developed remarkable skill, making her début as a public entertainer at Vienna in 1822. In 1827 she located in Paris and in 1832 married Count Gilbert de Voisins. After traveling extensively and giving entertainments in the leading cities of Europe, the family settled in London, where her large fortune was lost in speculation. Subsequently she supported here self by giving lessons in deportment at London and later at Marseilles. Her style was known as the ideal, and she appeared to the best advantage in "La fille du Danube."

TAGUS (tā'gŭs), the largest river in the Spanish peninsula, which rises near the boundary of Aragon and New Castile and, after a general course of 542 miles toward the southwest, flows into the Bay of Lisbon, an inlet from the Atlantic. Much of its basin is dry and barren and its banks are precipitous in many places. It is navigable for a distance of 115 miles. Among the principal tributaries are the Jarama, Zezere, and Zatas rivers. Lisbon, Santarem, and Toledo are the chief cities on its banks.

TAHITI (tă'hē-tē), one of the Society Islands, the largest island of the group. It consists of two parts, having a total length of 32 miles, these being connected by an isthmus three miles wide. The area is given at 412 square miles. The surface is diversified by a number of ridges, but it has a considerable area of fertile valley coast lands. Among the chief productions are sugar, arrowroot, cocoanut, dyewoods, domestic animals, cotton, and cereals. Papeete, or Papéiti, the capital, is the principal town and trading center and has a safe harbor. France established a protectorate over Tahiti and the Society Islands in 1844. Population, 1916, 10,834. See Society Islands.

TAHLEQUAH (tä-le-kwä'), a city of Oklahoma, in the Cherokee Nation, 80 miles northwest of Fort Smith, Ark. It occupies a fine site in the valley of the Illinois River, on the Saint Louis and San Francisco Railroad, and is surrounded by a productive farming and stockgrowing country. The principal buildings include the Tahlequah Institute, the courthouse, the high school, and the Cherokee National Library. It has manufactures of earthenware, utensils, and wearing apparel. Several newspapers are published in the town, both in the English and Cherokee languages. The place was settled in 1836 and incorporated in 1889. It was the capital of the Cherokee Nation before that region was united with Oklahoma to form a State. Population, 1900, 1,482; in 1910, 2,891.

TAILOR BIRD, a genus of birds of the warbler family, so named from their habit of sewing leaves of cotton or other substances to form a receptacle for the nest. The nest proper is made of cotton, wool, loose hairs, and twigs, and four eggs are usually laid. These birds include a number of species, most of which are

native to the East Indies and Southeastern Asia. The common tailor bird measures about six inches exclusive of the tail, which is about as long as the body. The upper part is greenish



TAILOR BIRD.

and the lower part is whitish. It is the most ingenious species in sewing together the leaves, usually taking two leaves at the extremity of a twig and stitching them by passing vegetable fibers through holes made by the bill.

TAINE (tan), Hippolyte Adolphe, historian and critic, born in Vouziers, France, April 21, 1828; died in Paris, March 6, 1893. After attending the College of Bourbon, he entered the Paris École Normale, and was for some time a teacher of history and aesthetics of art. A doctor's degree was conferred upon him in 1853 and he soon after devoted himself entirely to literature. His "Essay on Livy" won the Academy prize in 1854, and the following year he published "Travels in the Pyrenees." In 1864 he completed his "History of English Literature," a work of remarkable force and historical value. Oxford University conferred a degree upon him in 1871, and he was made a member of the French Academy in 1878. The writings of Taine take high rank because of their excellent composition, beautiful style, and the conscientious spirit of the writer. Many of them have been widely translated. Among his numerous writings not mentioned above are "Philosophy of Art in Greece," "Origin of Contemporary France," "French Philosophers of the 19th Century," "Critical and Historical "Origin of Essays," "Philosophy of Art in Italy, Greece, and the Netherlands," "Ancient Régime," "The Revolution," "Modern Régime," "On the Intelligence," and "Notes on Paris."

TAI-PINGS (ti'pings'), the followers of Hung-Sew-Tseuen, a professed Christian who was at the head of a rebellion in China from 1850 to 1864. The leader of the rebellion was

popularly called Teen Wang, or Heavenly King. He endeavored to expel the reigning Tartar dynasty and in its stead establish a Chinese dynasty, to be called Tai-ping, or Great Peace. Peking had been captured by the allied French and English army in 1860, and the treaty exacted made it of commercial interest to these governments and to the United States to restore and preserve order. Gen. F. T. Ward, an American, was given command of the allied forces, under whom the rebels were defeated at Shanghai in 1860. On the death of General Ward, in 1862, C. G. Gordon, commonly called Chinese Gordon, was placed in command and the insurrection was finally crushed in 1867. The protracted war damaged many of the commercial cities and wrought much injury in several of the best provinces.

TAIT (tat), Archibald Campbell, ninetysecond Archbishop of Canterbury, born in Edinburgh, Scotland, Dec. 22, 1811; died Dec. 3, 1882. He studied at Glasgow University and Oxford, where he became tutor and fellow. As a tutor he joined three others in opposing the Tractarians and ranked as a leading opponent of that movement. In 1842 he was made head master of Rugby to succeed Dr. Arnold. He was appointed dean of Carlisle in 1849, bishop of London in 1856, and Archbishop of Canterbury in 1868, thus becoming primate of all England. Tait established the evening services in Saint Paul's Cathedral at the time he was bishop of London and supported the public worship regulation act in 1874 while primate. His numerous writings include "Harmony of Revelation and the Sciences," "Dangers and Safeguards of Modern Theology," "Church of the Future," "Present Condition of the Church of England," and "Word of God and the Ground of Faith."

TAJ MAHAL (täzh må-häl'), a beautiful tomb and monument near the city of Agra, India, which was constructed by Emperor Shah Jehan as a mausoleum for himself and his favorite wife, Noor Mahal. It occupies a fine situation just outside the wall of the city, about a mile east of the fort. The structure is of white marble. The main features include the mausoleum in the center, above which a beautiful dome rises, and at each corner is a smaller dome or minaret. Both the exterior and interior are elaborately decorated, and on the inner walls are many passages from the Koran written in solid stones. The general design, elaborate perfection, and complexity of grace are alike remarkable. It is estimated that 20,000 workmen were employed in its construction for 22 years and that it cost \$4,200,000.

TAKU (tä-kōō'), a town of China, in the province of Chi-li, thirty miles east of Tientsin. It is finely located near the mouth of the Pei-ho River and is strongly fortified. The forts of Taku were captured by the British and French fleets in 1859. At the time of the

Boxer rising, in 1900, they were attacked and captured by the allied troops.

TALC (tălk), a granular mineral with a shining luster, quite greasy to the touch, and inclined like mica to separate into sheets. It consists quite largely of magnesia and silica, usually in the proportion of 33 parts of the former to 62 of the latter, and nearly 5 per cent. of water. The color ranges from white to blackish-green. It is either transparent or translucent when in thin sheets. Different varieties are called potstone, soapstone, and steatite, or French chalk. Talc is used for hearthstones, paint, and wall plaster. In a powdered state it is useful as a lubricant. The Chinese employ it to some extent instead of glass in windows. Steatite is used to some extent instead of chalk. The richest talc mines occur in North Carolina, where the mineral is found in large strata, and the product scales much like slate. It is found in New Hampshire, Vermont, Maryland, Massachusetts, Virginia, and New Brunswick. In 1908 the production of the United States was 54,800 tons, besides which a small quantity was imported. The larger importations are from Canada.

TALCA (täl'kà), a city of Chile, capital of the province of Talca, 135 miles south of Santiago. It is situated on the Calaro River, about 45 miles from the coast, and is on the Santiago-Concepción Railway. The manufactures include woolen blankets, clothing, cigars, and machinery. It has a large trade in wheat, fruits, and live stock. Population, 1916, 41,878.

TALENT (tăl'ent), a unit of weight and money in ancient Greece. The talent as a unit of weight was the highest denomination in the system of Greece, equal to about 82 pounds avoirdupois. A talent of different denomination was used by the Hebrews and Babylonians. The Greek talent as a monetary unit was valued at about \$1,000, and the Sicilian talent, sometimes called the little talent, was of gold and weighed about three-fourths of an ounce avoirdupois. As a monetary unit the Greek talent was divided into 60 minus and 6,000 drachmas.

TALISMAN (tăl'iz-man), a figure cast in metal or engraved upon stone, supposed to confer on its possessor supernatural powers. The talisman was made at a particular hour and under the influence of certain planets, and it was supposed to have a favorable influence in averting disease and calamity. It differs from the amulet in that the powers of the latter are passive and only preservative from harm and injury, while the talisman, prepared under a favorable conjunction of planetary influences, could subject to him the elements and enable him to pass through the air or over the seas. It was thought effective in winning the affection of a beloved object and to strike an adversary with a deadly blow with entire safety of the possessor. Advancement in educational art has caused the talisman to be discredited in civilized

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countries, but some lingering traces of the same superstition are still left in the charms which are supposed to bring good luck. Images of saints and rosaries were employed in the Middle Ages as talismans. The medicine bag of the North American Indian and the fetich of the

African are forms of talismans.

TALLADEGA (tăl-là-dē'gà), a city of Alabama, county seat of Talladega County, sixty miles east of Birmingham, on the Southern and the Louisville and Nashville railways. It is surrounded by a fertile farming and fruit-growing country. Large quantities of coal, iron, and marble are obtained in the vicinity. It has the Presbyterian Orphans' Home, the Talladega College, and the State schools for the deaf, dumb, and blind. The chief buildings include those of the county and several fine schools and churches. It has manufactures of hosiery, cotton goods, leather, flour and grist, fertilizers, The public utilities include and machinery. waterworks, sewerage, and electric lighting. General Jackson defeated a force of Creek Indians on the site of Talladega in 1813, when about 300 Indians were slain, while the Americans lost about 100 men. Population, 1900, 5,056; in 1910, 5,845.

TALLAHASSEE (tăl-là-hăs'se), the capital of Florida, county seat of Leon County, 25 miles north of the Gulf of Mexico and 163 miles west of Jacksonville. Communication is furnished by the Seaboard Air Line, the Carrahelle, Tallahassee and Georgia, and the Georgia, Florida and Alabama railroads. It is surrounded by a fertile farming and fruit-growing region, which yields large quantities of cotton, tobacco, and tropical fruits. The principal buildings include the State capitol, the county courthouse, the Leon County Academy, the Florida State College, the Walker Library, and the Florida State Normal College. Bloxham Park is a fine public resort. Among the manufactures are tobacco, wine, woodenware, and utensils. place has systems of waterworks, electric lighting, and sanitary sewerage. It became the territorial capital in 1822, but was not platted until 1824, and the capitol building was begun in 1826. Near the city is the old Spanish fort of

San Louis. Population, 1910, 5,018.

TALLEYRAND-PÉRIGORD (tăl'li-răndpā-rē-gôr'), Charles Maurice, Prince of, eminent diplomatist, born in Paris, France, Feb. 13, 1754; died May 17, 1838. He was the eldest son of the Count of Talleyrand and would have been trained for a military life, but this be-came impossible on account of being lamed while yet a child. He was brought up by strangers, as was customary in that time, and, after attending the College of Harcourt until 1770, he was admitted to the Seminary of Saint Sulpice. His devotion to study prepared him for early admission to the Sorbonne, and in 1780 he was made agent general of the French clergy. He was consecrated bishop of Autun

in 1788 and the following year was elected a member of the national assembly, of which he became president in 1790. In the same year he joined 300 priests to celebrate the fall of the Bastille, but was soon after excommunicated by the Pope and never again resumed his profession.

He was sent on a mission to England in 1792 with the view of effecting a conciliation, but on the fall of Louis XVI, was proscribed for intriguing in favor of the royalists. The alien act required him to leave England and he sailed, in 1794, to the United States, where he engaged in a number of successful speculations. His name was stricken off the list of exiles in 1796, thus permitting his return to France, where he became minister of foreign affairs. He used that position in favor of Napoleon, who recognized in him a powerful supporter and an able diplomat. It was his influence that reconciled a majority of the Directory to Napoleon and, after the fall of that body on Nov. 10, 1799, he promoted the successful organization of the consulate.

Talleyrand-Périgord was again made minister of foreign affairs under the new order of things, and as such furthered the diplomatic schemes of Napoleon, who was fast attaining mastery. In 1804 the empire was established and he was its grand chamberlain, and two years later was made Prince of Benevento. The two became estranged after the Peace of Tilsit in 1807, but the interview between Napoleon and Alexander of Russia at Erfurt, Germany, in 1808, proved that he still had marked influence, as also did his opposition to the Spanish War. In 1814 he was largely instrumental in bringing about the abdication of Napoleon, and for that service was rewarded by Louis XVIII. with the third appointment as foreign minister. In that capacity he concluded a secret treaty with Austria and England and, when the allies entered Paris. in 1815, he became president of the council. Opposition to the conditions imposed by the allies upon France caused him to resign the office and retire to private life, but he still remained an important advisory factor among leading statesmen. He was offered the position of foreign minister a fourth time in 1830, shortly after Louis Philippe had ascended the throne, but this he declined and accepted in its stead the office of ambassador to London, in which capacity he concluded a valuable peace treaty between the two nations, but retired finally from public life in 1834. His last two years showed that he was in sympathetic touch with the people of France, and during his final illness was visited by the king and many of the leading statesmen. His memoirs were published in 1891 under the editorship of the Duc de Broglie.

TALLIEN (tä-lyän), Jean Lambert, eminent revolutionist, born in Paris, France, in 1769; died there Nov. 16, 1820. He learned the printer's art early in life, attaining to the position of overseer of the Moniteur in 1791, and the following year became an editorial writer of a Jacobin newspaper. Soon after he was made a deputy to the convention, where he supported Marat and voted for the execution of the king, and in 1793 became a member of the Committee of Public Safety. While serving as a member of that committee he visited a number of the western provinces of France to oppose the Girondists, and in that capacity caused many of his opponents to be guillotined. He was chosen president of the Convention on March 22, 1794, but there he was opposed and denounced by Robespierre and his name was finally stricken from the list of Jacobins. However, he maintained his influential position among leaders of France until 1798, when opposition forced him to leave the Council of Five Hundred. Subsequently he accompanied Napoleon to Egypt, but never again attained to prominence in public affairs, being dismissed by Talleyrand as consul to Alicante, and finally died in obscurity.

TALLOW (tăl'lo), the product obtained from rendering the fat of certain animals, especially that of cattle, goats, and sheep. It is a mixture of olein, palmitin, and stearin and is derived by submitting the fat to hear in kettles. The best grade of tallow is obtained from the fat found near the kidneys of cattle and grades of less value come from other parts, especially the caul, which covers more or less of the intestines. Pure tallow is somewhat whiter than lard, is almost tasteless, and has a peculiar odor. It is soluble in boiling alcohol and has a specific gravity of about .935. It is an important article of commerce and is used in making soap, candles, and lubricants. The better grade is employed in making oleomargarine. A vegetable tallow is obtained by boiling the berries of various plants, such as the tallow tree.

TALLOW TREE, a class of trees yielding vegetable tallow, a product of value in candle making. A number of widely different species have been described. They are distributed more or less in regions having a temperate climate. Most of them have large leaves and fragrant flowers and the stem measures from 25 to 50 feet in height. The vegetable tallow is secured by making incisions in the stem and by boiling the seeds, but the capsules and seeds of other species are the only parts that yield this product. These are boiled and crushed and the fatty substances are afterward secured by pressure. The Chinese tallow tree belongs to the spurge family and is cultivated extensively in China, India, and the warmer parts of America, especially in Georgia and the Carolinas. The West African, or Sierre Leone, tallow tree is of the gamboge family and both its seed and trunk yield a yellow, greasy juice. Copal is the product of the trunk and is used in making soap and varnishes.

TALMA (tál-má'), François Joseph, tragedian, born in Paris, France, Jan. 15, 1763; died Oct. 19, 1826. He studied in London and Paris and first appeared upon the stage in 1787. At first he was not successful in winning favor, but he rose rapidly in the estimation of the public after 1789. For some time he was regarded the greatest tragedian of his period. He won the friendship of Napoleon, Danton, and other prominent men in France. His appearance on the stage was usually in a fancy costume, somewhat different than that of his time, and he powdered his face and head excessively. Later he adopted a correct costume. His greatest successes were made in Voltaire's 'Mahomet" and Chenier's "Charles IX."

TALMAGE (tăl'māj), Thomas DeWitt, eminent divine, born in Bound Brook, N. J., Jan. 7, 1832; died April 12, 1902. He first studied law, later entered New Brunswick Theological Seminary, and in 1856 received a pastorate at Belleville, N. J. Subsequently he held an important charge in Philadelphia and in 1869 was called to a Presbyterian church in Brooklyn, where he attained remarkable success. The church building being burned in 1872, it was soon succeeded by a larger structure, which was likewise burned in 1889, and was replaced in 1891 by a magnificent edifice costing \$400,000. A fire destroyed the last mentioned in 1894 and the following year he removed to Washington, D. C. Many of his sermons were published in the daily papers of America and Europe, and a number of his writings have been widely translated. The University of New York gave him a degree in 1862 and in 1884 he received a degree from the University of Tennessee. He visited Europe and the Holy Land in 1889. His writings include "From Manger to Throne," "Crumbs Swept Up," "One Thousand Gems," "The Marriage Ring," "Sports That Kill," "Sermons," and "Around the Tea-Table." He contributed to The Advance, The Christian at Work, and Frank Leslie's Sunday Magazine.

TALMUD (tăl'mud), the name sometimes used to designate all the teaching of the Jewish In this sense the term comprises the Mishna, the Gemara, and the writings commonly called the Old Testament, but it is employed more frequently to describe the body of Jewish civil and canonical law not comprised in the Pentateuch, commonly including the Mishna and the Gemara, but sometimes limited to the latter. The Mishna is properly the first part of the Talmud and consists of a collection of traditions and decisions made by Rabbi Juda, which he compiled about the year 192 A. D. to sum up all previous rabbinical labors. On the other hand, the Gemara is the second part of the Talmud and embraces an exposition of the first part. The Mishna was written in Hebrew and the Gemara in Aramaic. The greater part of these works is devoted to religion and ethics,

but they contain more or less of writings that may be classed as history, philosophy, and sci-Jews generally hold the Talmud of greater importance than the Old Testament, but it is looked upon by Christians as being a fund of information regarding later developments in Judaism and as containing numerous exaggerations. The Talmud was first preserved in traditional forms and fragmentary writings, which were afterward collected into written volumes. Two collections are extant, known as the Jerusalem Talmud and the Babylonian Talmud. The former embodies the discussions on the Mishna of the Palestine doctors from the 2d to the middle of the 5th century and the latter, those of the Jewish doctors in Babylonia from about 190 to the 7th century. These works are written with the subject-matter in the center of the page and around the margins are notes and comments.

TAMAQUA (ta-ma'kwa), a borough of Pennsylvania, in Schuylkill County, 37 miles north of Reading, on the Little Schuylkill River. It is on the Philadelphia and Reading and the Central of New Jersey railroads. In the vicinity are extensive coal mines. It has a public library and a number of fine schools. The manufactures include hardware, flour, boots and shoes, knit goods, and clothing. It has electric lighting, waterworks, and sewerage. The vicinity was settled in 1799 and Tamaqua was chartered as a borough in 1852. Population, 1910, 9,462.

TAMARIND (tăm'a-rind), a tropical tree of the bean family, which was originally native to the East Indies, but is now extensively nat-



COMMON TAMARIND.

uralized and cultivated in other warm regions. About forty species have been described, ranging from shrubs to large trees, but the common tamarind usually ranges in height from thirty to forty feet. The leaves are alternate and pinnate, the flowers are reddish-yel-

ers are reddish-yellow, and the fruit consists of a brown-shelled pod from three to six inches long, containing three to ten seeds. The seeds are used in making a beverage, in cookery, for preserving fish, and for various purposes in medicine. Pressed in syrup or sugar, the pods form the preserved tamarind of commerce. The wood, bark, leaves, and flowers have economic value, and the tree forms a fine ornamental plant. Species native to the East Indies frequently reach a height of eighty feet, and their pods contain more seeds than those raised in the West Indies. Other species are met with in the deserts of Asia and Africa, but these are invariably smaller plants.

TAMARISK (tăm'a-risk), the name of several shrubs and herbs native to Europe, found

chiefly in the region of the Mediterranean. The common tamarisk cultivated in gardens grows wild in Southern Europe. It is a fine shrub from twelve to fifteen feet high and has light green leaves and beautiful flowers. When in full blossom, it is one of the most beautiful shrubs, presenting a profusion of small red flowers. Another species, the German tamarisk, grows to a height of eight feet. The branches are upright and the bark is smooth, but the flowers are very beautiful. These plants are popular for ornaments in gardens and parks. Some species of tamarisk attain a height of thirty feet and are used as fuel, such as are common to the deserts of Arabia and Africa.

TAMBOURINE (tăm-boor-ēn'), an ancient musical instrument of the drum class, consisting of a wooden hoop, one side of which is open and the other is covered with a vellum head. Around the hoop are metal plates, which jingle when the instrument is played. The player strikes the head with the fingers, hand, or elbow, thereby producing a rolling sound, and intensifies the musical effect by drawing the fingers or thumb over the skin. Tambourines are popular among the Italians, Gypsies, and Basques and are used extensively in various parts of America and Europe. A form of these instruments is employed with good effect by the Salvation Army, usually in connection with a drum and cornet.

TAMERLANE (tăm-ēr-lān'). See Timur. TAMIL (tā'mĭl) a race of people native to Ceylon and southern India. They are classed with the Dravidian peoples of India. It is supposed that they inhabited the country before it was invaded from the north by the Aryans, whose culture they adopted. Their language is spoken in the northern part of Ceylon and a large part of India. They have an important and extensive literature and many of the writings are in verse.

TAMMANY SOCIETY, a political organization of the Democratic party in New York City, which has long wielded marked influence in the municipal and State elections.' The first organization, founded in 1789 by William Mooney, was known as the Columbian Club, but in 1805 the society incorporated under its present name, which was derived from an Indian chief of the Delaware tribe. Aaron Burr in 1800 placed the society on such a thoroughly organized footing that it controlled New York City politics and gave him the Vice Presidency. first building was erected by the society in 1811. and in 1822 the power of the organization was merged into its general committee. Consecutive growth increased the committee to 1,400, and the chairman finally developed into a boss of the hall. William M. Tweed was the most noted of the bosses, but his corruption was finally exposed and he was imprisoned in 1871, dying in jail with a suit pending against him which the city had brought for the recovery of \$6,000,000. Though crippled for some time, it soon reorganized and is now the most potent influence in the city politics of Greater New York. The society supported Garfield for President in 1880 and thereby defeated Hancock, but its opposition to Cleveland in 1884 did not secure the vote of New York to Blaine. More or less friction between the society and Democrats of New York outside the city has weakened the party to some extent in the State. In 1896 the Tammany Society opposed the candidacy of Bryan, but it supported him in 1900 and in 1908. Richard Croker, Frederick Smythe, John Kelly, and Thomas L. Leitner are among its most recent leaders. At present the membership is 11,250.

TAMPA (tăm'pà), a city in Florida, county seat of Hillsboro County, on Tampa Bay, at the mouth of the Hillsboro River. It is on the Seaboard Air Line and the Atlantic Coast Line railroads. The place has a fine harbor and has steamboat connections with Havana, New York, Charleston, and other American ports. Among the noteworthy buildings are the county courthouse, the public library, the Convent of the Holy Names, the Tampa Bay Hotel, and many fine churches. It is noted both as a summer

and a winter resort.

Tampa has large interests in the manufacture of tobacco, cigars, clothing, earthenware, machinery, and canned goods. Other important industries include fishing and wholesaling. It has a considerable export and import trade. The city has electric lighting, street railways, waterworks, sewerage, paved streets, and several public grounds, including De Soto Park. It was settled in 1848 and incorporated in 1886. Population, 1905, 22,823; in 1910, 37,782.

TAMPA BAY, an extensive inlet from the Gulf of Mexico, on the west coast of Florida. It is 38 miles long and from six to fifteen miles wide. The northern part is divided into Old Tampa Bay and Hillsboro Bay. Within the bay are numerous small islands, and at its entrance, on Egmont Key, is a lighthouse. Marketable fish and turtles abound in the bay, and it is important as a spacious and safe harbor. Tampa, on its northern shore, is the chief port.

TAMPICO (tam-pe'kb), a seaport city of Mexico, in the state of Tamaulipas, about 225 miles northeast of the city of Mexico. It is situated near the mouth of the Panuco River, about five miles from the Gulf of Mexico, and has convenient railroad connections with the interior. The harbor is made unsafe by sand bars, but jetties enable vessels drawing 24 feet of water to enter. It has two hospitals, a customhouse, and several schools and churches. The city has broad and regular streets, but is rather unhealthful on account of its site being low and swampy. Sewerage, telephones, and electric lighting are among the facilities. It has exports of tallow, hides, salted meat, and fish. Population, 1918, 27,168.

TANA (ta'na), a river of British East Af-

rica, which rises in the southwestern slope of Mount Kenia and discharges into the Indian Ocean. In the upper course it has many falls and cataracts, but the lower part passes through alluvial plains. A bar obstructs it at the entrance, but it is navigated about 350 miles during the rainy season. The entire length is 500 miles.

TANAGER (tăn'a-jer), a family of passerine birds belonging to the finch family. They are native to the warmer regions of America. The species number fully 300, most of which are noted for their brilliant plumage and fine colors. The hues include mainly beautiful shades of orange, scarlet, and black. A large number of the species are birds of fine song, particularly the organist tanager, a bird found largely in Central America. Some of the species visit the warmer parts of the United States, frequenting places as far north as Massachusetts. They are quite shy and cautious, and their nests are built in places safely isolated from dwellings. A species known as the summer redbird is about seven inches long and has an alar extent of twelve inches. The festive tanager has a parrot-green plumage.

TANANARIVO. See Antananarivo.

(tăn'kred), eminent Italian TANCRED prince, born in Sicily in 1078; died in Antioch in 1112. He was the son of the Marquis Odo the Good and of Emma, sister of Robert Guiscard, and became distinguished as a leader of the first Crusade to the Holy Land. His services were distinguished particularly at the siege of Nicaea in 1097, at the Battle of Dorylaeum in the same year, and at the capture of Jerusalem in 1099. He was a claimant to the throne of Jerusalem, but when that honor fell to Godfrey de Bouillon he was made Prince of Galilee. Subsequently he defended with great valor the Christian cause against the Mohammedans and infidels, especially at Antioch and on his campaign to various parts of Asia Minor. He not only carried the contest to Tripoli, but expelled the Saracens from Syria, and settled several quarrels among the Christian princes in Palestine. Tasso represents him as the flower of chivalry in his famous poem, "Jerusalem Delivered.

TANERA (tå-nā'rā), Karl, novelist and military writer, born at Landshut, Germany, June 9, 1849; died in 1904. After a careful military training he joined the army of Bavaria and saw active service in the War of 1866 and the Franco-German War of 1870 and 1871. He was made an attaché of the department of military history in 1882, but retired in 1887 to devote his attention to literary work, having attained the rank of captain. In 1891 he completed his "War of 1870-71," which comprises one of the most valuable historical works of the war between France and Germany. His "Wars of Germany from Fehrbellin to Königgrätz" was completed in 1894. He is perhaps better known by his novels and publications relating to travels in Africa,

some of which have been widely translated. These works include "Recollections of an Ordnance Officer," "Sketches from Three Grand Divisions," "Germany's Campaigns in East Asia," "Life of Officers in War and Peace,"

"Severe Campaigns," and "Tour of the World."

TANEY (ta'ni), Roger Brooke, eminent jurist, born in Calvert County, Maryland, March 17, 1777; died Oct. 12, 1864. His father was a Roman Catholic planter in Maryland, where the family settled shortly after coming from England. He graduated from Dickinson College in 1795, and four years later became a member of the Maryland bar. In 1799 he was elected a member of the house of delegates, served in the State senate from 1816 until 1821, and two years later began a successful law practice in Baltimore. President Jackson appointed him Attorney-General of the United States in 1831, in whose Cabinet he was a trusted and valuable adviser. He was made Secretary of the Treasury in 1833, and in that capacity supported Jackson in removing the deposits from the United States Bank to local banks, but the Senate would not confirm his appointment, though the deposits had already been taken from the bank. The President nominated him in 1835 to succeed Chief Justice Marshall on the supreme bench, and the appointment was confirmed the following year. The official service of Chief Justice Taney was marked by many important events, particularly concerning the question of State sovereignty and the extension of slavery. His decision in the Dred Scott case is the most celebrated, and involved the question whether a slave owner could remove into free territory and still retain title to his slaves.

This celebrated decision was the occasion of much discussion. Dred Scott had been carried by his master from Missouri, a slave State, into Illinois, a free State, and accordingly claimed his freedom, but Chief Justice Taney held such removal did not constitute liberation. Much excitement followed the application of this decision, since it set aside the Missouri Compromise and allowed the extension of slavery to the territories. It was commonly reported that Taney made the statement, "A slave has no rights which a white man is bound to respect," but it was proven later that he never employed the language imputed to him. That he did not use language of this kind is shown by his own conduct, since he liberated all the slaves inherited from his father's estate. The law opinions of Taney are contained in the "Supreme Court Reports," and his "Memoir" was published some time after his death.

TANGANYIKA (tän-gän-yē'kä), one of the great lakes of tropical Africa, situated between German East Africa and the Congo Free State. It stretches in a direction from southeast to northwest, has a length of 415 miles and an average width of 30 miles, and its surface is 2,700 feet above sea level. The basin is a deep

depression between hills and mountains, though the western coast is somewhat the higher, and the eastern portion is partly in the Great Rift Valley. Numerous rivers flow into it, but they are not large streams. The outlet is by the Lukuga River into the Congo. Speke and Burton discovered this lake, in 1858 and extensive explorations were made soon after in its vicinity. In ordinarily dry seasons the evaporation equals the inflow, when the Lukuga ceases to discharge, but in the wet period there is a considerable outflow. Vast and valuable forests abound in the vicinity of the lake, and on its eastern shore is the town of Ujiji, the most important in that region. Other towns include Albertville and

Bismarckburg.

TANGIER (tan-jer'), or Tangiers, a seaport city of Morocco, near the western entrance of the Strait of Gibraltar, about 10 miles east of Cape Spartel. It occupies a fine site on the Bay of Tangier, overlooking the strait, and is defended by walls and several forts. The noteworthy buildings include the Great Mosque, the Roman Catholic church, the provincial government houses, and the buildings occupied by the foreign ministers and consuls to the Morocco court, all of whom have their residence at Tangier. The streets are in a poor condition, mostly narrow and dirty, but there is a considerable foreign and interior trade, particularly in live stock, minerals, clothing, utensils, and raw materials. Tangier is the ancient Tangis and was founded by the Carthaginians, but later became a Roman possession. Charles II. of England received it as the dowry of the Infanta of Portugal in 1662, but the expense of maintaining the government caused its abandonment in 1684. It was besieged and bombarded by the French in 1844. The inhabitants consist mostly of Mohammedans, but include 6,000 Christians and 7,000 Jews. Population, 1917, 35,650.

TANJORE (tăn-jōr'), an inland city of India, capital of a government of the same name, 175 miles southwest of Madras. It is located in the midst of an extensive plain, about 45 miles west of the Bay of Bengal, and has considerable railroad and trade advantages. Among the notable buildings are the great pagoda, a beautiful Hindu temple, and the palace of the rajah. It is the seat of a number of mosques, churches, public offices, and educational institutions. The manufactures include earthenware, silk textiles, cotton and woolen goods, and machinery. It has a considerable trade in cereals, live stock, and fruits. In 1773 the British laid siege to the town and soon after annexed it to their colonial possessions. Electric and gas lighting, telephones, pavements, and waterworks are among the improvements. Population, 1916, 58,780.

TANNHÄUSER (tăn'hoi-zer), or Tanhauser, the subject of a favorite German legend, of the Middle Ages, who is represented as a knight traveling to become acquainted with the beauties and wonders of the world. It is related

that upon reaching the city of Venusburg, he entered the cave palace of Lady Venus, and that he lived at her court in great pleasure until he became conscience smitten. The voice of Virgin Mary commanded that he make a pilgrimage to Rome to invoke remission of his sins by Pope Urban, but his sins were of such a magnitude that the Pope declared it quite as impossible to absolve them as for the wand he carried in his hand to again assume life and bear buds and leaves. The knight returned in dire despair to Venusburg, but the Pope soon after found that his wand actually sprouted and began to grow. This was taken by the Pope as a sign from God that the knight still had an opportunity for salvation, and accordingly sent messengers to all lands in search of him, but the lost knight could be found nowhere. Richard Wagner based his opera "Tannhäuser" on this legend, and Tieck and other poets treated it in song and sonnets. Many primitive people have similar legends, in which subterranean palaces of kings and queens are described minutely. The visit of Ulysses to the Isle of Calypso is a noted example.

TANNIN (tăn'nĭn), or Tannic Acid, the name applied to certain astringent substances occurring in the bark and other parts of plants. They are widely distributed in various forms throughout the vegetable kingdom. These substances possess the property of coagulating albumen and gelatin and forming dark-colored precipitates with salts of iron. They occur in large quantities in oak bark and to a lesser extent in that of hemlock, willow, elm, pine, and chestnut. Tannin is derived from the bark of the plum, pear, and other fruit trees. Forms of tannin occur in the bark of the sumac and the whortleberry. It is found in the leaves of the ash-tree and several allied plants. Coffee, tea, and other substances contain a certain per cent. of tannin. It has many important uses in the arts and trades, particularly for tanning or converting the skins of animals into leather. This operation depends on the formation in the skin of an insoluble compound of tannin and the albuminoid matter of the skin. The tannin employed mostly is derived from oak and cinchona bark, which is ground to a coarse powder and piled in alternate layers with the skins in deep vats. The vats are then filled with water and the skins are allowed to soak for a few weeks or months, until they have become penetrated by the tannin.

TANNING. See Leather.

TANREC (tăn'rek), or Tenrec, the name of a genus of mammals found in Madagascar. They are insect-eating animals and somewhat resemble the hedgehogs. The hairs are spiny, and the young have actual spines, but these are shed when the permanent teeth develop, to be replaced with spiny bristles about an inch long. These animals are nocturnal, coming out at night to search for food. Although they appear to prefer insects, they feed partly on worms and the tender roots of plants. Some species are

molelike and do damage by burrowing in the rice fields.

TANSY (tăn'zy), a coarse perennial plant of the composite family. It is native to Europe and Asia, but has been naturalized in North

America, where it grows as a common weed along the roadside. It attains a height of two to three feet, bearing finely dissected leaves and rayless heads of yellow flowers. All parts of the plants are strongly aromatic and bitter, which circumstance has led to their medicinal and culinary use.



The oil of tansy is highly poisonous. Under medical advice it may be taken as a remedy in dropsy and as a worm-destroying agent.

TANTALUS (tăn'tà-lus), in Greek legend, a wise and wealthy king of Lydia, with whom the gods associated. On several occasions he was permitted to sit at a table with Zeus, who listened with interest to his wisdom and delightful conversation. Later he lost these distinguished marks of divine favor by stealing nectar and ambrosia from the table of the gods, with which he regaled his friends. Later he killed his own son, Pelops, and served him at one of the banquets to the gods. Zeus condemned him for these offenses to eternal punishment in the Lake Tartarus and afflicted him with an eternal thirst. As Tantalus stooped to drink of its waters, they receded from his parched lips, and the tall trees overhanging the shore with beautiful fruit withdrew as he attempted to grasp their delicacies that hung over his head. Not only was he continually taunted, but a great rock forever threatened to fall upon and crush him. The word tantalize was derived from the subject of this myth.

TANTRA (tan'tra), the name of a Sanskrit book that treats of a religious ceremony, relating chiefly to the worship of Siva, or of Sakti, the female principle. Several works of this class of literature are extant. As a whole they deal with the creation and the destruction of the world, lay down a ceremonial form for the worship of the gods, and contain prayers and rituals. One of the leading Hindoo commentators mentions not less than 65 Tantras. Collectively they are considered as a fifth Veda, though they are much more recent, all dating subsequent to the

Christian era. The followers of the Tantras, called the *Tantrikas*, worship by means of mystical rites.

TAOISM (tā'ō-ĭz'm), a form of religious worship in China, based upon the teachings of Lao-tse, a scholar of the 6th century B. C. The religion probably existed from prehistoric times, but no authentic information regarding it can be traced further back than the time of Lao-tse, an official who appears to have given it definite form and made it popular. He published a small work under the title "Classic of the Way and of Virtue," which teaches a form of religion something similar to naturalism or rationalism. Gentleness, humility, economy, and the return of goodness for evil are among the principal requirements. The priests of Taoism practice a form of mysticism, determine lucky and unlucky days, and regulate popular feasts. They admonish their followers to cultivate the simplicity and innocence of former days and practice divination by the use of a system of broken and unbroken lines, which they determine with the so-called Shih sticks. Formerly Taoism was a mere system of superstitions and fanciful notions, but it developed into a religion through the adoption of certain peculiarities common to the Buddhist faith. Many monasteries and temples devoted to Taoism are found in China and a few are met with in other countries of Asia, especially in Anam and Japan.

TAPAJOS (tā-pā-zhōsh'), a river in Brazil, which rises by two branches near the boundary of Bolivia, and, after a course of 1,100 miles toward the northeast, joins the Amazon near Santarem. It is formed by the junction of the Arinos and Juruena rivers, and a short distance below the junction are a number of important falls, some of them twenty to thirty feet. The greater part of the main channel is navigable, and in its lower course is a lakelike expansion, which in some places widens to twelve miles. The Arinos River has its source only eighteen miles from the Paraguay, both rivers rising in a diamond-producing district. The valley is highly

fertile and contains fine forests.

TAPESTRY (tăp'es-try), a kind of ornamental figured cloth of wool or silk. Usually the figures are raised above the surface and enriched with gold and silver, the designs representing men, animals, historical subjects, or landscapes. The term was originally applied to ornamental hangings, which were adjusted in dwellings to hide the walls, or to form screens or curtains. The term tapestry is employed at present not only to describe hangings, but also coverings of furniture of churches and apartments of public offices. Hand tapestry is embroidered by the needle, woolen or silk threads being worked into the meshes of a fabric. The different colored designs are made by working short lengths of thread at the proper places and fastening them at the back of the textile.

In many European countries beautiful tapestry was made for adornments in monasteries and churches by noble ladies, who engaged in the art largely for the sake of occupation and benevolence. The loom began to be introduced for making tapestry in the 9th century, after which much of the work was done by machinery, although the rare and beautiful designs are still hand-made. Tapestry of Flemish manufacture in the 14th and 15th centuries took very high rank, which gave rise to the large enterprises devoted to its production at Bruges, Antwerp, Brussels, and other cities. The art was not introduced in England until in the reign of Henry VIII., but there were manufactures of considerable importance in France, Germany, and other continental countries long before. France was celebrated for the productions of tapestry in the time of Louis XIV., when the celebrated Gobelin's factory flourished in Paris. A variety of woven fabrics having a multiplicity of colors in their design are commonly called tapestry, but they do not properly belong to that class of woven fabrics. Tapestry carpet belongs to this class. See Bayeaux Tapestry.

TAPEWORM, the common name of a class of parasitic worms infesting the alimentary canal of vertebrates. They have no mouth or alimentary canal, but live by absorbing the juices of the animals they infest. The length varies from five to fifteen yards, and the typical species are ribbonlike, varying in breadth from two lines at the narrowest part to five at the broader end. At the narrow end is the head, which is supplied with suckers or hooks for adhesion, and a row of segments constricted off from it increase progressively in size toward the posterior. larger tapeworms have several hundred segments, each budded off from the head, the oldest being farthest from it. Each segment matures male and female organs, and, when it is developed, breaks off and is expelled from the bowels. To develop a new tapeworm, it is necessary that the matured segment be swallowed by some warm-blooded vertebrate. This may occur by drinking water or eating flesh of the swine or

other animals.

When the buds are swallowed, the fertilized ova develop into hooked embryos, which bore through the alimentary canal into the tissues, or into the blood vessels, and pass from the latter with the blood to the brain, liver, or other organs of the body, where they surround themselves with cysts containing a fluid and become bladder worms. The head is developed from the bladder worm, but is not capable of further development until it is swallowed by the proper host. Different species of tapeworms are found in the muscles of the ox, in the brain of sheep. and in the muscles of hogs. The broad or Swiss tapeworm inhabits certain fish, as the pike and turbot. In some cases persons infested by a tapeworm experience no inconvenience, but usually there is pain in the stomach, continual craving for food, faintness, and restlessness, and itching in various parts of the body.

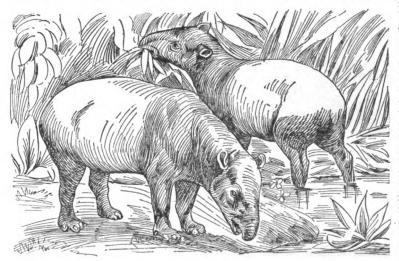
TAPIOCA (tăp-ĭ-ō'kà), a nutritious, starchy food derived from the large, tuberous roots of the cassava or manioc plant. The juice is obtained by pressing the roots and allowing the starch to deposit at the bottom of a vessel. Cassava starch being thus separated from the fibrous constituents, it is spread upon iron plates while in a moist condition and, under the application of the heat, the starch granules become partly ruptured and agglomerate into irregular pellets. In this condition the starch forms the tapioca of commerce and is employed largely in making puddings and as light, nutritious food for invalids. The portion of the root remaining after the starch has been extracted is ground to a pulp and used in warm countries to make manioc or cassava bread, which is eaten largely by natives and the poorer whites. Tapioca is manufactured in large quantities in the West Indies, Brazil, and the East Indies, where different species of the cassava plant are grown. Some species yield tubers weighing twenty to thirty pounds.

TAPIR (tā'pēr), a class of hoofed quadrupeds, which have a bulky body and moderately long legs. In appearance they somewhat resem-

natives, the meat being considered quite nutritious. When pursued by the jaguar, it rushes to the water and finds safety in diving. The tapirs of Malaysia and Sumatra are larger than those of South America, the body being seven to nine feet long. They are easily tamed and domesticated, when they become quite gentle. Living representatives are not found in Europe, but fossil remains are very abundant, some of them approximating the elephant in size.

TAR, an oily liquid secured by the destructive distillation of organic substances, such as coal, wood, shale, and peat. The two principal classes sold in the market are wood tar and coal tar. The former is the product of the special distillation of several varieties of wood, and the latter is a primary by-product of the distillation of coal for the manufacture of illuminating gas. Large quantities of tar are made in the forests of North Carolina, and to a greater or less extent in a number of other states. The usual plan is to excavate a shallow hole near the upper side of an embankment of a hill, into which the wood is piled in conical heaps, after being cut into sticks about three or four feet long and several inches thick. It is then covered with damp soil and fired, the tar being melted out of the wood while it burns slowly, and is collected

> in a large cast-iron can below, from which it is conducted through spouts into barrels. It requires two or three weeks to complete the burning of a large kiln, and 15 to 18 per cent. of the wood is converted into tar. Pitch pine and fir trees are used extensively in tar making, but the better trees are used in manufacturing turpentine. while the older and inferior classes are picked for tar making. Sweden produces large quantities of wood tar, in which country the trees are partly stripped of their bark several years before they are cut



AMERICAN TAPIR.

ble the hog, but the legs are longer and the nose is not fitted for digging in the soil. The snout is prolonged into a proboscis. The skin is thick and covered with short but close hairs, the tail is short, the ears are small, and the neck is clothed with a short, stiff mane. Tapirs have four toes on the fore feet and three on the hind ones. They are found in large numbers in South America, ranging from the Isthmus of Darien to the Strait of Magellan. The color of the South American tapir is brown, and the size is about that of a small ass. The flesh is eaten by

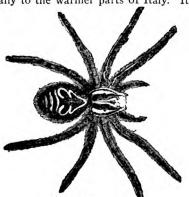
down, this serving to increase the quantity of resinous matter.

The chemical constituents of tar include acid, alkaline, and neutral substances. It is used chiefly for coating the planks and cordage of ships, in making tar paper, in constructing tar pavements and tar roofs, for protecting iron work from the weather, and for making valuable disinfecting compounds, such as creosol and carbolic acid. Coal or mineral tar was first manufactured in the latter part of the 18th century, though only to a limited extent, but when

coal gas came largely into use it became greatly cheapened and entered more extensively as a merchantable product into the market. The tar resulting in the manufacture of gas was first produced in such large quantities that it could not be disposed of successfully, but since then it has entered largely into the industries as a fuel and for producing hydrocarbon oils, pitch, and analine colors.

TARANTO (tä'ran-tō), a city in the southern part of Italy, at the northern end of the Gulf of Taranto, 45 miles southwest of Brindisi. It is situated on an island, which was formerly a peninsula, and is separated from the Gulf of Taranto by the Little Sea. The harbor is one of the best in Italy and admits the largest vessels. It has railway facilities, well-paved streets, electric lighting, and electric street railways. The principal buildings include the Cathedral of Saint Cataldo, an episcopal palace, the castle, and the public library. Among the chief manufactures are cotton and linen goods, macaroni, canned and cured fish and oysters, and olive oil. The city was founded by the Greeks about 707 B. C. and was anciently known as Tarentum. It became the leading Greek city in Italy and remained independent until 272 B. C., when it was captured by the Romans. Hannibal took possession of it in the Second Punic War, but it was later retaken by the Romans. Few relics from ancient times are extant. Those remaining are principally traces of several temples and an amphitheater. Population, 1916, 61,327.

TARANTULA (tà-răn'tū-là), or Tarentula, a species of spider native to Southern Europe, especially to the warmer parts of Italy. It is so



TARANTULA.

named from Taranto, Italy, where tarantulas occur in considerable numbers. The body is elongated, being a little more than an inch in length, and the color is brownish. This spider belongs to the hunting class and displays remarkable ingenuity in running down its prey. The bite was formerly thought to produce the disease called tarantism, but it is now known to be no more dangerous than that of a common wasp. A class of hairy spiders, known as tarantulas, are native to Texas and other Southern

States. The body is large and the bite is quite poisonous. A species known as digger wash is an allied form and is peculiar for making deep holes in the ground, which it lines with silk and covers with webs. The females are peculiar for

carrying their young on the back.

TARAPACA (tä-rà-pà-ka'), a province in northern Chile, which is of vast importance because of its extensive deposits of saltpeter. The area is 19,306 square miles. Iquique is the capital and principal seaport. A railroad line extends from the capital to the saltpeter deposits twenty miles inland. Vast reducing works are maintained at various points, largely by foreign capitalists, and the annual export of this commodity is valued at \$27,500,000. The soil of Tarapacá is dry and barren and a mountain range trends nearly parallel to the coast, in which rich deposits of silver are worked. Nearly all the inhabitants are dependent upon the saltpeter and silver mining industries. Formerly the region belonged to Peru, but it was ceded to

Chile in 1884. Population, 1916, 92,985. TARBELL (tär'bĕl), Ida Minerva, author, born in Eric County, Pennsylvania, Nov. 5, 1857. She studied in the high school at Titusville and at Allegheny College, and for some years was assistant editor of The Chautauquan. In 1891 she entered the Sorbonne, in Paris, as a student, and subsequently studied at the College de France. After returning to the United States, she became associate editor of McClure's Magazine. Her books include "Early Life of Abraham Lincoln," "Short Life of Napoleon," "History of the Standard Oil Company," "Life of Abraham Lincoln," and "Life of Madame Roland.

TARE, the name of several species of plants native to the Northern Hemisphere. They belong to the pea family and are known as vetch in some localities. The root is annual, the leaves are oblong, and the climbing stem grows to a height of three feet. The flowers are usually in pairs, either red or purplish, and the seeds are nutritious. Several species are grown extensively in Europe as feed for cattle and horses. They thrive best in a rich sandy soil, but are frequently sown for green manure in tracts that need fertilizing. Mention is made of the tare in Matt. xiii, 36, but it is supposed to refer to the darnel.

TARENTUM (ta-ren'tum), a borough of Pennsylvania, in Allegheny County, 20 miles northeast of Pittsburg. It is on the Allegheny River and the Pennsylvania Railroad and is surrounded by an agricultural region. Among the features are the public library, the high school, and several fine churches. The manufactures include plate glass, bottles, paper, flour, and machinery. Electric lighting, waterworks, and sewerage are among the public utilities. Population, 1900, 5,472; in 1910, 7,414.

TARGET (tär'get), a mark or butt set up to be shot at, as to test the accuracy of a firearm

or the force of a projectile. It is usually made of steel in a circular form and in the center is the bull's eye, around which are two or more wide rings. In target practice it is customary to cover all portions of the target, except the bull's eye, with a white or light blue paint. This enables the marksman to distinguish in taking aim at the bull's eye, which, when struck, causes a figure to spring up at the top. If the center is missed, the ball or other projectile causes a mark in the newly applied paint, hence the best marksmanship can be determined easily. Target practice is usually at distances of from 100 to 300 yards, but a sharpshooter usually practices at 500 yards. All kinds of small arms are used in practicing, but army practice is chiefly with the carbine, rifle, or revolver.

TARGUM (tar'gum), the name applied to one of several Chaldee versions of the Old Tes-These translations became necessary when the Hebrew language was superseded by the Chaldee, or Aramaic, tongue, in the general vocabulary of Palestine. Although they are not of great value for the criticism of the text, these writings are helpful in that they furnish means to study the life and custom of the people at the time they were written. Among the Targums extant are those of the Prophets, Job, Ruth, Esther, Lamentations, Song of Songs, Ecclesiastes, Proverbs, and Psalms. There are in fact three Targums to Esther and three to the Pentateuch.

TARIFA (tà-re'fà), a seaport city of Spain, in the province of Cadiz, on the Strait of Gibraltar. It occupies an imposing site 25 miles southeast of Cape Trafalgar, where it was founded in 710 A.D. by an Arab chief named Tarif ibn Malek. The Moors required all vessels passing through the Strait of Gibraltar to pay duties at Tarifa, and the duties were called tarifas, whence came the English word tariffs. A force of Spaniards from Castile captured Tarifa in 1292, and the French took possession of it in 1823. Population, 1917, 13,168.

TARIFF (tăr'if), a list or schedule of duties to be paid to the government for the importation or exportation of articles of merchandise. The list is usually in alphabetical order and the rates are subject to frequent changes, owing to the circumstance that duties depend on the supply and demand of goods and on the interest and wants of the community. Tariffs may be prohibitory or retaliatory, and may be charged specifically or ad valorem. The tariff rates may be settled by government authority or by agreement between different nations. In the United States tariffs are levied only on imports for revenue and protection, but many articles are on the free list. Both export and import duties were charged in the colony of New Netherlands as early as 1629, and the Massachusetts Bay colony levied import taxes in 1668. An unsuccessful effort was made by the Continental Congress to unite the colonies on a general tariff tax law.

CANADA. The present tariff law of Canada was enacted in 1907, when the former Customs Act of 1897 was repealed. It provides for three rates of duties, known as the general tariff, the intermediate tariff, and the British preferential tariff. In addition to these it provides a surtax and a special, or dumping, duty. The general tariff applies to all articles which are not admissible under either the intermediate or the British preferential tariffs. The intermediate tariff applies to all goods that the Governor General may by Order in Council designate. However, no country is at present entitled to this class of rates. The British preferential tariff applies to all goods that are produced or manufactured in the United Kingdom and certain British countries that may be admitted to the benefits of the same. A surtax is levied upon the imports from countries that do not treat imports from Canada as favorably as those from other countries. The special, or dumping, duty is levied on goods which are sold to consumers in Canada at a lower price than the fair market value.

UNITED STATES. President Washington signed the first tariff act passed by the United States on July 4, 1789. It was prepared by Alexander Hamilton and provided duties ranging from 5 to 15 per cent., though only 47 articles were specially enumerated. The purpose of this tariff was to provide revenue for the general government, both for its support and to discharge the national debt. It provided duties averaging 8 per cent. ad valorem, but the duties were raised to 11 per cent. in 1790 and to 13 per cent. in 1792. Refined sugar and tobacco were placed on the tariff list in 1794, and another extension of the list was made in 1797. Hamilton and the Federalists advocated, largely for political reasons, the adjustment of the tariff so as to give protection to American industries. This theory went into effect in the form of the Lowndes-Calhoun bill of 1816, which imposed duties of about 25 per cent. on leading manufactures, but the agricultural South and commercial New England protested against it. In 1824 a new tariff bill was passed, which provided an average rate of 37 per cent. and increased the duties on metals and agricultural products. This measure was championed by Henry Clay, who made himself the leader of the so-called American system, which aimed to combine a high protective tariff with Federal expenditures for internal improvement.

The so-called tariff of abominations, imposing duties on raw materials, was passed in 1828, and provided a rate of 41 per cent. Calhoun and South Carolina remonstrated against this measure, owing to the fact that some of the duties were prohibitive, and they were supported and aided in the protest by Alabama, Georgia, and North Carolina. It was claimed by the opponents of the measure that Congress had no right to levy tariff duties for protection, urging not only the injustice of a high tariff from which

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exporting states received no benefit, but also its general unconstitutionality. In 1832 the tariff laws were modeled after those of 1824, but they still retained the principle of protection, and South Carolina immediately proceeded to nullify the act. Jackson met nullification with marked decision, but Henry Clay introduced the Compromise Bill of 1833, which provided for a gradual reduction of tariffs to a uniform rate to be reached in 1842. The Polk-Walker tariff of 1842, so called from Robert J. Walker, Secretary of the Treasury under President Polk, changed all existing rates but was a protective measure. In 1846 a new tariff was enacted, which provided a so-called tariff for revenue only, though it retained protective features. The tariff of 1857 made a further reduction of duties and remained in force until 1861.

The Morrill tariff went into effect on April 1, 1861, and practically doubled existing duties.

Immediately after the Civil War enlarged the necessary expenditures of the government, which were met by several successive bills raising the tariff. A modification of rates was made in 1870, when tea, coffee, and several other articles were added to the free list. Quinine was added to the free list in 1879 and shortly after a reduction was made in the duty on pig iron, wool, steel rails, paper, and glass. The McKinley tariff of 1890 enlarged the free list, but increased the duties on many commodities and provided a bounty of two cents per pound on sugar in lieu of duty. Some articles were taxed so high that importation was practically prohibited. The Wilson tariff of 1894 reduced the duties about 38 per cent, and enlarged the free list considerably. It carried with it a tax of 2 per cent, on the excess above \$4,000 per annum of all incomes, but the Supreme Court declared this feature unconstitutional. The Wilson tariff was repealed in 1897, when the Dingley tariff took its place. In 1909 the Dingley tariff was succeeded by the Payne-Aldrich tariff, which is so named from Sereno E. Payne, a member of Congress from New York, and Nelson W. Aldrich, a Senator from Rhode Island, these being the chairmen of the ways and means committees of the House and the Senate respectively. This tariff measure was repealed in 1913, when the

TARKINGTON, Newton Booth, novelist, born in Indianapolis, Ind., July 29, 1869. He studied at Princeton University, where he graduated in 1893. He was elected to the State Legislature in 1902 and the same year married Laurel Louisa Fletcher. His writings are artistic and have attracted considerable attention. Among his chief works are "The Gentleman from Indiana," "Monsieur Beaucaire," "The Two Vanrevels," "In the Arena," "The Conquest of Canaan," and "The Beautiful Lady."

Underwood tariff law was enacted.

TARLETON (tärl'tun), Sir Banastre, soldier, born in Liverpool, England, Aug. 21, 1754; died Jan. 23, 1833. He began the study of law, but entered the army at the beginning of the war for independence in America. In 1776 he operated with Clinton against Fort Moultrie and the following year accompanied Cornwallis into New Jersey. Later he took part with Howe in the battles of Brandywine and Germantown, and in 1779 was made lieutenant colonel of a force of cavalry and light infantry. With this force he operated in the South until the fall of Yorktown, in 1781, and returned to England the following year. As a cavalry leader he gained a reputation for cruelty, especially at Waxhem Creek and at Camden, where he routed a part of the force under General Gates, but was defeated by General Morgan at Cowpens early in 1781. He served in the British Parliament for a term of years, was made a general in 1812, and became a baronet in 1815.

TARN (tarn), a river of France, one of the chief tributaries of the Garonne. It rises in the Cévennes Mountains, receives the Agout and the Averyon, and has a length of 215 miles. The valley is rich in the vine, coal, and cereals.

TARNOPOL (tär-nô'pôl-y'), a city of Austria, in Galicia, on the Sereth River, 75 miles east of Lemberg. It has railroad facilities and is noted as a horse market. The manufactures include machinery, clothing, and furniture. A large part of the inhabitants are Poles and

Jews. Population, 1910, 33.853.

TARPEIAN ROCK (tar-pe'yan), the name of a precipitous rock forming a portion of the Capitoline Hill in Rome, so named from Tar-peia, daughter of Spurius Tarpeius, governor of the citadel on the Capitoline of Rome. It is related that the Sabines bargained with the Roman maid to open the gate of the fortress to them, and as a reward promised her the golden ornaments worn on their arms. As they passed through the gates, they threw on her their shields, saying, "These are the ornaments we bear on our arms." She was crushed to death and buried on Tarpeian Hill. Ever after traitors were put to death by being hurled headlong from the hilltop.

TARPON (tär'pŏn), a large fish which is closely related to the herring. It is found in the West Indies and the waters off the southeastern coast of the United States. The eyes are large, the mouth is placed obliquely, and the dorsal fin is high. It grows to a length of four to six feet and has great power in leaping and swimming. While the flesh is not valued highly, the tarpon is valuable for its silvery cycloid scales, which are used in making ornamental work. This fish affords much sport in angling. Tarpon fishing is popular along the southern coast of Florida

and Texas.

TARQUIN (tär'kwin), or Tarquinius, Lucius, fifth legendary king of Rome, who is sometimes called Priscus, meaning The Elder. Tradition makes him the son of Lucumo, a Corinthian nobleman of Etruria, who subsequently settled in Rome in accordance with the advice of his wife, the prophetess Tanaquil. It is alleged that an eagle descended from a high eminence and snatched his cap while on the way to Rome, but afterward restored it. From this circumstance future honors were predicted for him in the Roman city, and his name was changed to Tarquin. King Ancus Martius made him the guardian of his children and gave him high position at the court, and, after the death of the king, he was chosen his successor. He defeated the Latins and Sabines on several occasions, thus adding numerous towns to Roman territory. Tarquin made vast improvements at Rome, where he constructed sewers and baths, erected the Forum and the Circus Maximus, and laid the foundation for the capitol. He began the great walls defending the city, and instituted several of the celebrated Roman games. His successful reign of 38 years came to an end about 578 B.C., when he was assassinated by friends of the sons of Ancus Martius.

TARQUIN, or Tarquinius, Lucius, surnamed Superbus, son of Lucius Tarquin Priscus, the last of the legendary kings of Rome. He was the son-in-law of Servius Tullius, whom he murdered in 534 B.C. to attain the Roman throne. His government was cruel and tyrannical, but his bold and warlike energy caused Rome to gain great advantages in military power and wealth, causing it to rise to the most eminent place among the Latin confederate states. He abridged the privileges of the plebeians, banished and proscribed many of the senators, and controlled the nation without consulting the senate. Many of the plans laid by his father were carried out, and he likewise improved and strengthened the city. He conducted a siege of Ardea, a strongly fortified town of the Rutuli, in 510 B. C., but during his absence a rebellion was organized under the leadership of Lucius Junius Brutus, and he was exiled by the senate and the army revolted against him. He made three unsuccessful attempts to regain his power, in which he was joined by several neighboring cities, but was at last compelled to abandon the enterprise and flee to Cumae, where he died in 495 в. с.

TARRYTOWN (tăr'rĭ-toun), a village of New York, in Westchester County, 25 miles north of New York City. It is situated on the east side of Tappan Bay, an extension of the Hudson River, and is on the line of the New York Central Railway. The location is on ground rising gradually from the river, furnishing a fine view of the bay, and it is popular as a residential center. Among the institutions are the Irving Institute, the Institution of Mercy, and the Tarrytown Lyceum, which contains a library of 5,000 volumes. A short distance north of the village is the graveyard of the Dutch Church, in which the remains of Irving are buried. The older buildings include the Dutch Church, erected in 1699, and the Philipse Manor House, dating from 1683. The village has public

waterworks, electric lighting, and manufactures of machinery and automobiles. Sunnyside, the home of Washington Irving, is at Irvington, about two miles south of the village. Major André was captured at Tarrytown in 1780. Population, 1905, 5,370; in 1910, 5,600.

TARSHISH (tar'shish), the name of an ancient commercial emporium mentioned in the Old Testament. It is first spoken of in Gen. x, 4. However, in this instance reference is probably made to Crete and Rhodes. Later references are believed to refer to settlements by the Phoenicians in Spain at the mouth of the Guadalquiver. The latter locality is supposed to be referred to from the fact that its products are identical to those connected with the region of Tarshish.

TARSUS (tär'sŭs), an ancient city in Asia Minor, in the Turkish province of Adana, 10 miles from the Mediterranean. It is located on the Cydnus River, in a fertile region, and has a considerable trade in cotton, wheat, barley, gallnuts, and various manufactures. Tarsus has a number of fine mosques and public baths, and near it are ancient ruins of extensive walls, theaters, and public buildings. The city was founded by Sardanapalus. It was captured by Alexander the Great, but afterward fell into the possession of the Romans, under whom it became a city of great importance. It was long a powerful commercial rival of Antioch, Alexandria, and Athens. Cleopatra and Antony ascended the Cydnus as far as Tarsus. The apostle Saint Paul and several Greek scholars were born at Tarsus. Population, 12,500.

TARTAR (tar'ter). See Cream of Tartar. TARTAR EMETIC, the name applied to a double tartrate of potassium and basic antimony. It is made by preparing a paste of acid potassium tartrate and antimonious oxide, which are mixed with water and allowed to stand for several hours, when the compound is boiled and allowed to crystallize. The taste is sweetish, but it leaves an unpleasant sensation in the mouth. Though soluble in water, it cannot be dissolved in alcohol. Tartar emetic is a powerful irritant. It is used in reducing fever and sometimes to produce vomiting, but physicians do not prescribe it as much as formerly, for the reason that it has a depressing effect upon the heart and nervous system.

TARTARIC ACID (tär-tăr'îk), the acid found in grapes, pineapples, tamarinds, and other fruits. It is prepared commercially from argol, an impure potassium acid tartrate deposited from wine by converting it into a calcium salt, decomposing with sulphuric acid, and allowing the solution to crystallize in a warm place. Tartaric acid is deposited in the casks in which wine is kept. This form of the acid may be purified by crystallization from boiling water and converted into cream of tartar. Tartaric acid crystallizes in large prismatic crystals and is soluble in about half its weight of water. By the action of heat

it is converted into several other acids, whose composition depends on the temperature at which the tartaric acid was decomposed. It is very sour to the taste, but is inodorous, and has a marked action on several metals, such as iron and zinc. Tartaric acid is useful in making lemonade, in calico printing and dyeing, as a medicine, and for making baking and soda-water powders.

TARTARS (tär'terz), the name usually applied to a class of people inhabiting parts of Asiatic Russia, principally the steppes of Central Asia. It has reference chiefly to Moslems of Turkish origin. Tribes of Tartars, different from the Turks, comprised the Mongolians, who migrated from the northern part of China and Central Asia toward the west in the period extending from the 4th to the 10th century, and of whom descendants still occupy parts of southern Russia. In the 12th century large numbers of true Tartars joined Genghis Khan and marched under his leadership from Chinese Tartary to Europe. Chinese Tartary is a region in northern China, whence the true Tartars moved westward. Little Tartary, a term frequently applied to southern Russia, comprises the governments of Astrakhan, Orenburg, Ekaterinoslav, the Crimea, and the Cossack provinces. The Tartaric language belongs to the Turanian tongues, of which the Turkish is the most typical, but there are many dialects.

TARTARUS (tär'tà-rūs), in Greek mythology, a son of Aether and Gaea, the father of the giants of Echidna and Typhaeus. In the *Iliad* the name Tartarus is applied to a region as far below hades as heaven is above the earth. This locality was regarded as the place of punishment for the spirits of the wicked. Later poets used the names Tartarus and the Elysian Fields as designating two divisions of hades, the former being occupied by the criminals and the latter by the dead.

TARTARY (tär'tà-rĭ), the name formerly applied to a vast region extending from the seas of Japan and Okhotsk to the Caspian Sea, including southern Asiatic Russia, Turkestan, Mongolia, and Manchuria. Little Tartary included the southeastern part of European Russia, and Independent Tartary was the name applied to the region now included in Turkestan, the latter being still called Tartary by some writers. The name originated from the great hordes of Tartars that moved westward from northern China in the 13th century and formed settlements in the central and western parts of Asia, extending westward as far as the Volga, in Europe.

TASCHEREAU (tå-sh'-rō'), Elzéar Alexandre, cardinal, born at Sainte Marie-de-la-Beauce, Quebec, Feb. 17, 1820; died April 12, 1898. He studied at the Quebec Seminary and in 1842 was ordained as a priest. He was connected with this institution about thirty years, first as a professor and later as director. In

1860 he was made director of Laval University, and two years later he became vicar general of the diocese. His efficient services caused him to be made archbishop in 1870, and he was appointed cardinal in 1886.

TASHKEND (tash-kent'), or Tashkent, a city of Asiatic Russia, in the government of Turkestan, of which it is the capital. It is located on the Tchirtchik River, a tributary of the Syr-Darya, about 400 miles southeast of the Aral Sea, and is surrounded by a fertile region. A lofty wall of brick and stone, about twelve miles in circuit, surrounds the city, which may be entered by twelve gates. The chief buildings include a fortified castle, many mosques and temples, numerous bazaars, and several schools and colleges. Among the manufactures are silk textiles, woolen and cotton goods, ironware, furniture, gunpowder, and utensils. The trade is very extensive, largely for the reason that it is of easy access by caravans, and Russian enterprise is rapidly developing highways and railroads. The streets are narrow and tortuous in the older parts of the city, but in the newer portions improvements have been made by paving, drainage, and the culture of avenues of trees. It has electric lighting, telephones, and street railways. Russia annexed the city and tributary

territory in 1866. Population, 1911, 166,045.

TASMANIA (tăz-mā'nĭ-à), a state of the Commonwealth of Australia, which includes the island of Tasmania and a number of adjacent islands. The island of Tasmania is situated in the South Pacific, 140 miles south of Australia, from which it is separated by Bass Strait. Its western shore is washed by the Indian Ocean. The form is that of a triangle, measuring 195 miles from north to south and 245 miles from east to west. The area, including the adjacent islands and the island of Macquarie, is 26,385 square miles. Macquarie is situated about 1,000 miles southeast and for administrative purposes belongs to the State of Tasmania.

DESCRIPTION. The coasts are quite abrupt and bold and are indented by numerous bays and harbors. Among the chief inlets are Oyster Bay in the east, Storm Bay in the southeast, and Macquarie harbor in the west. The surface is diversified with chains of mountains which range from 3,000 to about 5,000 feet above the sea. They reach the highest elevation in the northwest, in Cradle Mountain, which has an altitude of 5,069 feet. An extensive plateau region is located in the west central portion, but it is more or less diversified by ridges and isolated peaks. Through the central part extends a valleylike depression, through which numerous spurs of mountains trend in various directions. central plain has a direction through the island from the southeastern part, from the mouth of the Derwent River, almost due north, to the mouth of the Tamar River. Within the plain are a number of mountain lakes of considerable size, such as Great Lake and Sorell Lake. The Derwent is the largest river, flowing almost duly southeast into Storm Bay. It receives the inflow from numerous mountain streams and is the largest river of the island. The Huon is in the south, the Gordon and the Arthur in the west, the Tamar and the Forth in the north, and the Swan in the east.

The climate is more equable and temperate than that of Australia, being greatly influenced by the ocean, and it is warmer in the northern than in the southern part. The temperature ranges from 28° in winter to 100° in summer, and the mean temperature at Hobart is 46° during the colder and 63° during the warmer part of the year. Rainfall is greatest in the western part, where it ranges from 40 to 100 inches, and in the eastern section it is from 22 to 30 inches. The forests consist of Huon pine, beech, blue gum, acacia, eucalyptus, blackwood, and other native trees. Many species of birds common to semitropical countries abound, but the mammals common to the island are not numerous. The latter include the kangaroo, wombat, opossum,

Agriculture and the raising of INDUSTRIES. live stock are the main occupations. Wheat is grown on a larger acreage than any other cereal, but it is exceeded in the areas used in the cultivation of hay and green fodder. Corn, oats, barley, and potatoes are grown extensively. All fruits common to the Temperate Zone thrive, especially cherries, grapes, plums, quinces, almonds, apricots, and peaches. Silk culture and the mulberry tree have been introduced successfully. Sheep are the principal domestic animals, but there are extensive interests in rearing horses, cattle, swine, and poultry. The cultivation of hops is a profitable enterprise.

Mining is carried on with considerable success and copper is the principal mineral. The output of copper has an annual value of about \$4,850,000. Material development has been made in the output of gold the last decade. Silver is the third mineral in rank. Other minerals include tin, coal, and iron. Large deposits of sandstone, limestone, and granite abound, and these minerals are quarried extensively for construction purposes. More tin is produced in Tasmania than in any other Australian State, and the mines are chiefly in Mount Bischoff.

The manufacturing enterprises are favored by extensive water power available in the streams and by the fact that Tasmania has an abundance of raw material. Large quantities of butter and cheese are made for export. Mutton and beef are preserved extensively both by curing and freezing, and some interests are vested in canning fruit and fish. Other manufactures include woolen goods, furniture, hardware, earthenware, boots and shoes, and machinery. The leading exports are wool, wheat, sheep, dairy products, lumber, and minerals. A majority of the trade is with Great Britain and ports in Australia. chiefly in Victoria and New South Wales.

Railroad building has received considerable attention. A line extends across the island from Devonport, on Bass Strait, to Hobart, at the mouth of the Derwent River. Another line crosses the northern part of the island from east to west, and these trunk lines have numerous branches to inland points. The total lines aggregate 850 miles, most of which are owned by the government. Considerable coastwise trade is carried in small vessels, and the highways near the larger towns are in a good state of improvement. Hobart, Launceston, and Strahan are the leading ports for foreign trade.

GOVERNMENT. The chief executive power is vested in the Governor, who is appointed by the British crown. He is assisted by a cabinet of six responsible members. Legislative power is vested in the Parliament, which consists of a legislative council of eighteen members elected for six years and a house of assembly of 35 members elected for three years. Those voting for members of the legislative council are limited to a property franchise, while all citizens are eligible to vote for members of the lower house. The right to vote has been extended to both sexes. Educational interests have been liberally stimulated in the establishment of common and secondary schools and by the maintenance of several public and private colleges. The compulsory school attendance extends from the age of seven to thirteen years, and children who reside a long distance from school are carried by a State-owned railroad. The University of Tasmania, in which the educational work culminates, is located at Hobart, and with it is affiliated an institution at Launceston.

INHABITANTS. Formerly the island was inhabited by a native race similar to the races of Australia. They were low in stature, had broad faces, and the skin and hair were dark. These people declined rapidly after the island was colonized by Europeans. It is said that a woman named Tinganina, who died in 1876, was the last native Tasmanian. At present the inhabitants are chiefly British or of British descent. About two-thirds of the people belong to the Church of England and the remainder are Methodists, Roman Catholics, Presbyterians, Lutherans, Baptists, and Jews. Hobart, in the southern part, on the estuary of the Derwent River, is the capital and largest city. Launceston, on the Tamar River, near the northern shore, has a large trade. The emigration and immigration were about equal during the last decade. Population, 1907, 181,624; in 1910, 191,214.

HISTORY. Abel J. Tasman (1602-1659), a celebrated Dutch navigator, discovered Tasmania in 1642, and it was named Van Diemen's Land in honor of the Governor of the Dutch East Indies. Cook visited the island in 1769 and in 1803 a British expedition sailed from Sydney with the view of claiming the island for England. They founded a settlement on the present site of Hobart in the same year, and in 1806 located the city of Launceston. Convicts were transported for some time from Sydney to Tasmania, but a considerable immigration began in 1817, and since then the island has made rapid advancement in population and the development of material industries. It was declared independent of New South Wales in 1825. About 3,000 natives were in the island at the time of the discovery. Convict transportation to Tasmania was abolished in 1853. Many laboring men and settlers left Tasmania on the discovery of gold in Australia in 1851, but most of them returned to make the island their permanent home. Tasmania became a member of the Commonwealth of Australia in 1901.

TASMANIAN WOLF, an animal native to Tasmania, the largest representative of the carnivorous marsupials. It is about four feet long and has a doglike muzzle and a tapering tail. The general color is grayish marked with yellow, and it has a series of stripes on the hind part of the back. In habits it is nocturnal, coming out at night to search for food. It was formerly abundant, but has been nearly exterminated, since it proved destructive to sheep and poultry.

TASSO (tăs'sō), Torquato, epic poet, born in Sorrento, Italy, March 11, 1544; died in Rome, April 25, 1595. He was the son of Ber-



TORQUATO TASSO.

nardo Tasso (1493-1569), an eminent Italian epic and lyric poet. His father was exiled shortly after his birth, and his training devolved upon his mother, who sent him to a Jesuit school at Naples until 1554. He joined his father at Rome in the latter year and under his superintendence

studied in that city. Afterward he attended educational institutions at Bergamo, Pesaro, and Venice. In 1561 he entered the University of Padua to study law, but while there surprised his friends by publishing an epic poem in twelve cantos, entitled "Rinaldo." This production made him so famous that he was invited to the University of Bologna, where he studied philosophy, rhetoric, and literature. While there he began to write his celebrated poem of "Jerusalem Delivered," receiving financial aid from Cardinal Louis d' Este, to whom his "Rinaldo" had been dedicated.

In 1575 Tasso accepted a position in the court of Alfonso II., Duke of Ferrara, where he completed his "Jerusalem Delivered." Instead of publishing this famous production upon his own

responsibility, he submitted it for examination to several churchmen and critics at Rome. The criticisms suggested so preyed upon his mind that he became addicted to morbid fancies, imagining himself condemned to the Inquisition, and in a fit of excitement attempted to stab with his dagger a servant of the Duchess of Urbino, in 1577. An arrest followed this rash act, but he was released after confinement for two days. Subsequently he was affected in a similar way. and Duke Alfonso caused him to be confined at the hospital of Saint Anne at Ferrara, where he remained from 1579 to 1586. He was released in the latter year at the solicitation of Vincent di Gonzaga, and in 1595 was invited to Rome by Pope Clement VIII. to receive the laurel crown of the poet, but died before the ceremony took place. Among the writings of this eminent poet are "Aminta," "Discourses on the Art of Poetry," "Monte Oliveto," "Rime," and "Amadis." Tasso gained the friendship of Charles IX. by visiting France in 1570. His "Jerusalem Delivered" and "Aminta" are considered his master productions.

TASTE (tāst), the particular sensation excited when a soluble substance comes into contact with certain parts of the mouth, particularly with the tongue. The tongue contains the chief end organs of the nerves of taste, including parts of the fifth and ninth pairs of nerves, but the sense of taste extends to the soft palate and the arches of the palate. These nerves end in the papillae, which absorb the substances tasted and convey them to the nerves. The intensity of the sensation depends upon the surface coming in contact with the matters tasted, increasing with the surface exposed to a soluble substance. A temperature of 72° Fahr. is most favorable for producing the sensation. Temperatures much above or below this lessen the ability of the nerves of taste to receive im-

pressions.

Salt and bitter substances have the greatest effect at the back of the tongue, and, this part being reached by the gustatory nerve, a branch of the fifth nerve distributed to the anterior two-thirds of the tongue, which is in sympathy with the stomach, such flavors by sympathy often produce vomiting. Sweet and sour substances affect most notably the edges of the tongue, where branches of the fifth pair of nerves permeate. Since these nerves are connected with the face, an acid by sympathy distorts the countenance. Tastes may be classified by bitter, sweet, acid, and saline. The senses of taste and smell are intimately connected and much of the compound sensation produced by drinking or eating an aromatic substance, such as coffee, is due to smell rather than simply taste. Taste was originally the guide to select food, but it has become so depraved by the force of habit and condiments that it is difficult to discover the natural tastes in man. It is a more reliable guide in the choice of food among the lower animals than in man, since their taste is not influenced so greatly by habit.

TATTERSALL'S, the name of a market in Grosvenor Place, London, famous as a place for selling, riding, and driving horses. It was established by Richard Tattersall, in 1780, and has continued to remain the headquarters of the turf. This place contains an apartment in which the business of horse racing and betting throughout the country receives attention.

TATTOO (tăt-too'), a mark in the skin produced by indelible pigments. The practice of tattooing prevails to a considerable extent with the brown and yellow races, especially among the North and South American Indians, South Sea Islanders, Burmese, Bedouin Arabs, Dyaks, and Mongolians. Tattoos are made by marking the skin with punctures or incisions and introducing into the wounds colored liquids, gunpowder, or other substances, so as to produce indelible figures or designs on the body. The custom is practiced differently in various regions, some peoples placing the tattoos only on the arms or other concealed portions of the body, while in some sections variously designed figures are made in the skin of the face and over practically all parts of the body. It is quite painful to undergo the operation, but barbarians bear it with considerable fortitude, since in most cases the figures indicate degree of rank or are made as a mark of distinction or remembrance. Instruments of steel with small teeth are commonly employed in tattooing, but primitive peoples use bone or stone for that purpose. In many cases the figures are very elaborate and variously colored, often representing animals, landscapes, and historical scenes. The practice is very old, dating from the early history of mankind, and it has been favored by people high in the scale of civilization. Lev. xix., 28, prohibits its use among the Jews in these words: "Ye shall not make any cuttings in your flesh for the dead, nor print any marks upon you." Tattooing is a favorite adornment among the female Bedouins even at the present time. It was practiced in ancient times by the Thracians and Scythians and among the Britons and Irish.

TAUCHNITZ (touk'nits), Karl Christoph Traugott, printer and bookseller, born near Leipzig, Germany, Oct. 20, 1761; died there Jan. 14, 1836. He learned the printer's art when a mere youth and in 1796 founded an independent publishing establishment at Leipzig. His excellent business capacity and skill caused his institution to prosper, which he ultimately enlarged by adding a bookbindery and a type foundry. He began the issuance of a series of elegant classical works in 1809, which attained a wide circulation in Europe. In 1828 he issued an edition of Homer of extraordinary correctness, this being brought about by offering a ducat to every person pointing out an error. He introduced stereotyping into Germany in

1816 and was the first to apply that art in the publication of music. Later he stereotyped the Koran in the original Arabic and subsequently the Hebrew Bible. His nephew, Christian Bernhard Tauchnitz (1816-1895), founded a large printing business at Leipzig in 1837. He published a series of English translations of German authors and in 1842 began the "Tauchnitz Edition of English Authors," a series of publications now embracing about 3,750 volumes. The Duke of Saxe-Coburg-Gotha made him a baron in 1860. He was appointed consul for Saxony in 1872 and was made a Saxon life peer in 1877.

TAULER (tou'ler), Johann, theologian and author, born in Strassburg, Germany, in 1290; died there June 16, 1361 He became a Dominican monk in 1308 and studied theology in his native city and Paris. His religious opinions were influenced by Master Eckart and he developed into a mystic, teaching that the worship of God is to be manifest in the heart and life. He preached in Basel, Cologne, and Strassburg, and is the author of many works in the Latin and German. Among his chief writings are "Following the Lowly Life of Jesus" and "Sermans"

TAUNTON (tän'tun), a port city in Massachusetts, one of the county seats of Bristol County, on the Taunton River, 35 miles south of Boston. Communication is by the New York, New Haven and Hartford Railroad and a number of electric railways. It has an abundance of water power derived from the Taunton River. The streets are regularly platted and improved by pavements, waterworks, sewerage, gas and electric lighting, and avenues of ornamental trees. Among the noteworthy buildings are the public library, the county courthouse, the post office, the city hall, the Morton Hospital, the Bristol Academy, and the State insane asylum. Taunton Green and Woodward Spring Park are fine public grounds.

Taunton has a large jobbing trade and is noted as an industrial center. The manufactures include ironware, brick, locomotives, boots and shoes, soap, cotton and woolen textiles, hardware, furnaces, paper, agricultural implements, silver-plated ware, carriages, stoves, and farming implements. Herring fishing is a productive enterprise. The first settlement was made at Taunton in 1638. It was so named from Taunton, England, whence the first settlers came. The place was incorporated as a city in 1865. Population, 1910, 34,259.

TAURUS (ta'rus). See Zodiac.

TAURUS, a mountain range in Asiatic Turkey, forming the watershed between the Black and Mediterranean seas and stretching from the upper Euphrates to the Aegean Sea. The slopes toward the Mediterranean are steep and leave a narrow coast plain, but toward the north it merges gradually into the high plain of Asia Minor. Two divisions are included in the Taurus proper, known as Ala Dagh in the east and Bulghar Dagh in the west. The Anti-Taurus range connects it with the Caucasus, Elburz, and Ararat. The highest peak of the Anti-Taurus is Arjish Dagh, height 13,112 feet, and of the Taurus proper, Bulghar Dagh, 11,415 feet. Between Syria and Asia Minor is the valley of the Cydnus, forming a pass known in ancient times as the Cilician Gates.

TAX, an assessment levied upon persons, property, or business for the support of the government or other public service. It may be said that no system of taxation has yet been devised that rests with equal fairness upon all individuals in the state, and possibly the consummation and application of such a system can scarcely be reached, even in the most democratic form of government. The four principles of taxation laid down by Adam Smith, which have been generally accepted by writers on political economy, may be briefly stated as follows: each individual in a state should contribute to the support of the government in exact proportion to the relative ability of all; the system of taxation should provide a certain and not arbitrary tax upon each individual; each individual should be taxed to pay at the time and in the manner most convenient to himself; and the general system of taxation should be so adjusted that the people may not be pressed to pay more than is actually needed to support the state and supply adequate funds for the public treasury.

Taxes are divided into direct and indirect. Direct taxation is the term applied when the tax is paid directly to the municipality or state by the person upon whom it is levied, such as taxes upon real estate, domestic animals, machinery, dogs, an income tax, and a poll tax. On the other hand, in the scheme of indirect taxation the tax is levied on one person but really paid by another. Indirect taxes are assessed on commodities and the amount of the tax is added to the price of the commodity, thus requiring the consumer to pay it. This is illustrated by the internal revenue system, in which the stamp tax and excise taxes on tobacco and liquors are added to the commodities taxed. This may be illustrated quite similarly by the tariff system. For instance, if there be a duty of ten cents per pound on coffee, though nominally paid by the importer, it is added to the price of the article and the consumer pays that much more per pound.

The ancient governments levied taxes upon unfriendly nations, and the booty of war obtained by sacking cities was a considerable source of income in supporting the army and building up home enterprises. In many instances private property of subjects was confiscated for use by the state, tribute was exacted for special privileges in consideration of trade and social advantages, and crimes were made punishable by the payment of heavy fines, pay-

able either immediately or in installments. It was customary among the Jews to support the state by contributing the first born of their flocks and the first fruits of their lands, though the rates were increased under different sovereigns. The Roman Empire collected tolls, exacted payments for conferring the privileges of citizenship on individuals, carried away the treasures of conquered nations, and levied tribute upon various articles of trade. Feudalism was a system of land ownership by the sovereigns and nobles, under whom the common laborers were reduced to serfdom and belonged to the soil, while the fruits of the land flowed into the coffers of the rich and powerful to support them in luxury and the nation in authority. The systems of ancient and medieval peoples are still perpetuated in some of the countries of Europe and Asia, but advancement in civilization and educational arts is fast leading to the view held by the American colonists. "No taxation without representation."

Taxation now partakes of various forms and includes taxes levied by the school district, township, municipality, county, state, and nation. The national taxes consist of duties on imports and excise taxes, mostly on liquors and tobacco, with other forms added at different periods, such as stamp taxes and taxes on incomes. All other taxes are direct taxes and are assessments on real and personal properties, according to their estimated value. The assessment of railroad property is made in most instances by a state commissioner or an executive council. The value of property owned by individuals is ascertained by the assessor, whose estimates are subject to revision by a board of equalization, and the taxes are usually payable to the county treasurer, who later distributes the money to the different corporations and individuals entitled to receive the same. This form of direct taxation is with some exceptions the most equitable of any save that of the income tax.

In an income tax each individual pays according to the amount of profit per annum, while a property tax requires each to pay in proportion to the amount of property owned, but one's revenues are not always proportional to one's property. Besides, property is liable to double taxation in the case of mortgages, and in the form of money and valuable paper it is quite frequently withheld from enlistment by the assessor. Poll taxes are direct taxes, usually levied on those subject to military duty, who are required to pay from fifty cents to three dollars per year or work to the extent of that amount on the public highway. In case the tax levied on property is not paid, any personal or real property owned by the person taxed is subject to sale for nonpayment. Tax sales are quite common and usually take place about the first of December, the property tax being due usually the first of January, thus giving the payer about eleven months' time to make payment before the sale. Persons owning property sold for taxes are given two to three years in most states to make redemption, which is done by paying the taxes together with the cost and interest. Public property, such as courthouses and school buildings, is exempt from taxation in most countries. The houses of worship and the property of clergymen are exempt quite generally. See Single Tax.

TAXIDERMY (tăks'i-der-my), the art of preparing and preserving the skins of animals and of mounting them in a lifelike manner. The art is of considerable antiquity, but it reached a high state of development only about three centuries ago. Now vast collections of practically all kinds of animals may be seen in mounted condition in national educational institutions, colleges, and municipal museums of nearly all civilized countries, and their careful preservation has been the means of greatly stimulating research by naturalists and students. The process varies with the class of animals to be treated. It may be said that the general plan is to remove the skin, to which the feet, tail, hairs, and part of the head are left attached. All these parts are treated with an arsenic preparation, or with a powder containing arsenic, camphor, burnt alum, oak bark, and other substances, after which the skin is stuffed in such a manner that the form and size of the animal are carefully restored. The product is then perfumed with an aromatic substance, glass eyes are adjusted, and it is mounted to represent the living form. Reptiles, mammals, fishes, birds, and animals of all classes may be treated and preserved in this manner.

TAY (tā), the longest river of Scotland, which rises in the southern Grampians and, after a course of 120 miles toward the east, flows into the North Sea. It has an estuary of about three miles, but the tide flows a mile above Perth, to which city it is navigable for vessels drawing ten feet. The principal tributaries include the Dochart, Lyon, Garry, Tummel, Arn, and Almond. The cities on its banks are Dunkeld, Aberfeldy, Perth, and Dundee, the last mentioned being its chief port. The Tay valley is fertile. An area of 2,400 square miles is included in the basin. Valuable salmon and other fisheries occur in the Tay and its estuary.

TAYLOR (tā'lēr), a city of Texas, in Williamson County, 35 miles northeast of Austin, on the International and Great Northern and the Missouri, Kansas and Texas railways. The surrounding region is a fertile farming country. It has electric lighting, waterworks, and a large trade in wool, cotton, and live stock. The manufactures include flour, machinery, and cotton-seed oil. The shops of the International and Great Northern Railway are located here. Population, 1900, 4,211; in 1910, 5,314.

TAYLOR, Andrew Thomas, architect, born

in Edinburgh, Scotland, in October, 1850. He studied in Edinburgh and London and later took courses in several institutions on the continent. In 1883 he emigrated to Canada and established a line of successful work as an architect in Montreal. For some years he was professor of architecture in the Presbyterian college of Montreal and designed many buildings in that city. He published "Dominion Drawing Books" and "Towers and Steeples of Christopher Wren."

TAYLOR, Bayard, author and traveler, born in Kennett Square, Pa., Jan. 11, 1825; died in Berlin, Germany, Dec. 19, 1878. He

was the son of a farmer, who provided for his education at West Chester and Unionville, and at the age of seventeen he became apprenticed to a printer in West Chester. While there West he began to develop remarkable interest and talent for writing poetry and contributing to various news papers and



BAYARD TAYLOR.

magazines. His first published work was a volume of poems under the title "Ximena," in 1844, and in the same year he made an extensive tour of Europe, which enabled him to publish, in 1846, his "Views Afoot." Accounts of the tour through France, Germany, England, and Italy were published in the New York Tribune and the Saturday Evening Post, and on returning to America he was employed by Horace Greeley as an editorial writer on the New York Tribune. In 1849 he made an extended tour of California and Mexico, which he reported to the Tribune, but later published an interesting account of it in his "Eldorado, or Adventures in the Path of Empire."

Taylor made a tour to Egypt in 1851, visited Calcutta and China in 1852, and returned to the United States in 1854 to prepare descriptions of his journey and lecture in various cities. In 1857 he married Maria Hansen, the daughter of a German astronomer, and in 1862 was made secretary of legation at Saint Petersburg, Russia. His next tour was to Iceland, in 1874, and four years later he became United States minister at Berlin, where his death occurred. The writings of Taylor show a broad and genial spirit and overflow with a hearty sympathy. His lusty imagination and interesting style made his writings extremely popular and led to their wide translation. Among the productions not named above are "Journey to Cen-tral Africa." "Pictures of Palestine," "Visit to tral Africa," "Pictures of Palestine," India, China, and Japan," and "Northern Travels." His poems include "Quaker Widow,"

"Bedouin Song," and "An Old Pennsylvania Farmer." His principal novel is "The Story of Kennett." He translated from the German Goethe's "Faust," Schiller's "William Tell," and Richter's "Hesperus." His wife, Maria Hansen (born in 1829), translated many of his works into German. She edited his "Dramatic Works" and aided Horace E. Scudder in publishing "Life and Letters of Bayard Taylor."

TAYLOR, Henry Clay, naval officer, born in Washington, D. C., in 1845; died July 28, 1904. He graduated, in 1863, at the United States Naval Academy and was immediately assigned to naval service on the Gulf of Mexico. In 1864 he took part in the battle of Mobile Bay. Subsequent to the war he was assigned duty in the South Pacific station and in 1867 returned to the United States. Besides instructing at the Naval Academy, he took part in the surveying expedition of 1870, and in 1886 was made commandant of the navy yard at Norfolk. He was appointed president of the Naval War College at Newport, R. I., in 1893, served for some time as superintendent of the naval academy at Annapolis, and in 1897 became commander of the battleship Indiana. During the Spanish-American War he was with the fleet under command of Admiral Sampson, took part in the bombardment of San Juan, and on July 3d rendered efficient service in the naval fight that ended in the destruction of Cervera's fleet at Santiago. In 1902 he was made chief of the Bureau of Navigation and as such published a number of valuable reports.

TAYLOR, Jeremy, eminent churchman, born in Cambridge, England, Aug. 15, 1613; died Aug. 13, 1667. He graduated at Cambridge University, where he became a fellow in 1633, and later was stationed at Oxford. The bishop of London made him rector of Uppingham in 1638, where he became a supporter of the royal army, and in consequence was deprived of his charge by the Parliament. Subsequently he settled at Newton, Wales, to devote himself to literature. In 1642 he published "Episcopacy Asserted," for which he was awarded a degree by Oxford, and in 1647 appeared his most important work, "The Liberty of Prophesying." After the restoration, he was given a charge in Ireland, and later became a member of the Irish privy council of the University of Dublin. Among his later writings are "The Life of Christ," "Holy Living," "Golden Grove," "Twenty-Seven Sermons," and "Holy Dying."

TAYLOR, William, missionary and author, born in Rockbridge, Va., May 2, 1821; died May 2, 1902. He attended the public schools, began work as minister in 1841, and two years later joined the Baltimore conference of the Methodist Episcopal Church. In 1849 he went as missionary to California and in that year organized the first Methodist Church in San Francisco. He was prominent as an evangelist

from 1856 to 1861 and in the latter year made an extended tour of Europe and Asia. He was in Australia as evangelist from 1863 to 1866. in South Africa in 1866, in the West Indies in 1867, and in Ceylon from 1870 to 1876. Subsequently he established churches in India and South America and in 1884 became missionary bishop of Africa, from which position he retired in 1896. Few men attained greater success in evangelistic work. His services were especially effective among the Kaffirs and other natives of South Africa. His publications include "Christian Adventures in South Africa," "Seven Years' Street Preaching in San Francisco," "Election of Grace," "Our South American Cousins," "Infancy and Manhood of Christian Life," "Four Years' Campaign in India," "Story of My Life," "Reconciliation, or How to be and "Flaming Torch in Darkest Saved, Africa."

TAYLOR, Zachary, twelfth President of the United States, born in Orange County, Virginia, Nov. 24, 1784; died in Washington, D. C.,

July 9, 1850. He was the third son of Richard Taylor, a colonel in the Revolutionary War, who, in 1785, removed to the vicinity of Louisville, Ky., where he made his home in the then sparsely occupied region. The pioneer conditions of the country afforded little school advantages, but young Taylor was



ZACHARY TAYLOR.

surrounded in early life by conditions and circumstances well adapted to develop a sturdy character and fit him for an eventful career. He became a lieutenant in the army in 1808 and two years later was promoted to the rank of captain. In the same year he married Margaret Smith, a lady of Maryland. He commanded at Fort Harrison in 1812, where he repulsed an attack of the Indians under Tecumseh and received the brevet of major. In 1814 he commanded a force against the British and Indians on Rock River, became lieutenant colonel in 1819, and in 1832 was made colonel, with headquarters at Prairie du Chien, Wis.

Taylor occupied his time in the Black Hawk War and other campaigns until 1836, when he was transferred for service against the Seminole Indians in Florida, defeating them at Okeechobee. This gallant conduct caused his promotion to the rank of brigadier general, and in 1838 he was appointed to the chief command in Florida. In 1840 he was transferred to the western department of the army and in 1845 was ordered to the defense of Texas, which had been annexed to the United States. He occupied Corpus Christi with a force of 4,000



TEA PLANT. COPYRIGHT 1900, BY A. W. MUMFO (Thea sineusis).

A. Flowering Branch. 1. Section of Flower. 7. Seed. 8. Section of Seed. 9. Embryo.

Opp. Tea)

men and in March, 1846, drove the enemy across the Rio Grande, occupying Matamoros in May. Monterey was captured by him in September and in February, 1847, he won the Battle of Buena Vista, where he was opposed by an army of 20,000 men under Santa Anna. In the meantime he won the battles of Palo Alto and Resaca de la Palma, causing thereby patriotic enthusiasm throughout the Union.

The decided victories won by Taylor caused the Whigs to nominate "Rough and Ready," as he was called, for the Presidency. The nomination was given to him on the fourth ballot at the Philadelphia convention in 1848, defeating Henry Clay, Daniel Webster, and General Scott. The campaign was one of considerable excitement, since General Taylor was a slaveholder and had not voted for forty years, but he defeated Lewis Cass, the Democratic candidate, receiving 163 electoral votes while his opponent received 127. He was inaugurated March 5, 1849, but there was a Democratic plurality in Congress, while the Whigs were in a hopeless minority and the Free-Soil party held the balance of power. This condition in the legislative branch and important questions agitating the nation made it extremely difficult for the newly elected President, who was wholly unaccustomed to the ways of the statesman. Among the events of his administration are the admission of California, the settlement of the boundaries of Texas, and the organization of the new territory acquired from Mexico. Worn out by public cares, he died sixteen months after taking the oath of office. He was buried in Cave Hill

Cemetery, Louisville, Ky.

TAYLORVILLE, a city of Illinois, county seat of Christian County, 25 miles southeast of Springfield. It is pleasantly situated on the Wabash and the Baltimore and Ohio South-western railroads. The chief buildings include the high school, the Carnegie Library, and the county courthouse. Coal mines are worked near the city. It has manufactures of brick, tile, chemicals, and farming implements. The municipality has public waterworks and a system of sanitary sewerage. It was settled about 1839 and incorporated in 1882. Population, 1900, 4,248; in 1910, 5,446. TCHAD. See Tsad.

TEA, a genus of shrubs and trees allied to the camellia. They include species that vary in height from four to thirty feet. The most important species is the tea shrub, or Chinese tea, which in a native state grows to a height of twenty to thirty feet, but its development is limited to five or six feet when cultivated for its leaves, the important product that yields the tea of commerce. This plant has lanceolate leaves two to six inches long, produces large white flowers of fine fragrance, and is a hardy, evergreen species. It is propagated from the seed, but the young plants are not ready tor picking the leaves until three years old. They

yield best when eight to ten years old, and later diminish in the production of leaves, until finally new plants must be set out in their stead. The cultivated species of tea possess a wide adaptability to climate, being excelled in this characteristic among food plants only by wheat. The range of cultivation extends from 39° north latitude in Japan, to regions south of the Equator, including Java, Australia, South Africa, and southern Brazil. It can be grown successfully in the portion of North America lying south of a line drawn from California to South Carolina, but the greater cost of labor



LEAVES AND FLOWERS OF TEA.

in the United States as compared to that of Asia has made it impossible to successfully compete with the vast productions of China and Japan. A number of tea farms have proven quite successful under Japanese management in California, and in many sections of the southern states the tea plant is grown with profit.

Vast tea plantations are maintained in China and Japan, where the industry of growing tea tor the market has been established for many centuries. The leaves are picked by hand, an enterprise engaged in by the whole family, and the first crop is gathered in the spring, usually in April, the particular month of the year de-

pending upon climatic conditions. A second crop is harvested about a month later, this being the most valuable of the season, and two succeeding crops are produced afterward. Native names are applied to the different grades of tea, hyson meaning spring crop, pounchong signifying wrapped tea, and southong meaning small kind. Both green and black teas are procured from the same plant, this depending upon the process of curing the leaves. Green tea is made by drying the leaves quickly in pans They are then soon after being gathered. rubbed lightly between the palms of the hands or taken out and rolled on a table, after which they are placed in the pans and dried a second time. Black tea is secured by drying the leaves in shallow baskets in the sun and air, during which a saccharine fermentation is supposed to take place in conjunction with a volatile oil. During the chemical changes that occur while fermenting and drying, the leaves change slightly in color, and they are afterward roasted in an iron vessel and dried over a charcoal fire. The black color results from manipulation and drying, and the flavor is greatly modified in the process. Professional tea tasters are employed to sample and classify the tea according to its flavor. Green tea includes hyson, young hyson. hyson skin, gunpowder, imperial, and caper. Among the species of black tea are the pekoe, flowery pekoe, orange pekoe, pekoe souchong, congou, bohea, and souchong. Adulterations in tea are made by adding leaves of other plants and artificial coloring is frequently used, such as Prussian blue and a mixture of indigo and gyp-

According to Chinese legend, Emperor Chinnug discovered the virtues of tea in 2737 B. C., but it is quite probable that positive reliance cannot be placed upon the claim, since all knowledge of agriculture is traced to that sovereign by Chinese writers. Tea culture was carried from China to Japan in the 13th century, and these two countries were the only tea-producing regions until the early part of the 19th century. The Dutch established tea plantations in Java in 1825, whence tea culture spread rapidly throughout the East Indies. Soon after it was established in Ceylon, the West Indies, South America, Australia, and Southern Europe. The principal constituents of tea are a volatile oil, thein, tannin, and albuminous compounds. It has some soluble mineral matter, including phosphoric acid and potash. Thein is the active principle. Tea is imported principally from China and Japan.
TEACHERS' COLLEGE, an institution

TEACHERS' COLLEGE, an institution for the training of teachers, founded in New York City in 1880. Ten years later it was made a part of the educational system of Columbia University, in which it is represented by its dean and a member of the faculty, but it maintains a separate corporate organization. The courses consist of pedagogical work. They

embrace the history and philosophy of education, educational psychology, school administration, ancient and modern languages, mathematics, domestic and fine arts, the sciences, music and voice culture, physical education, manual training, and kindergarten. The Speyer School and the Horace Mann School are observation and practice institutions affiliated with the college. It maintains a large number of university extension courses, and ranks as the most important school of this class in the United States. The value of its property is \$2,150,000. It is attended by about 3,000 students.

It is attended by about 3,000 students. TEACHERS' INSTITUTE, an assemblage held under county or State supervision, designed as a normal or short training school for teachers and those who desire to engage in the teachers' profession. The first teachers' insti-tute was held in 1839, when Henry Barnard, secretary of the Connecticut board of education, called the teachers of Hartford County for a month's session at Hartford, and, with several instructors, gave those in attendance instruction in the theory and art of school-teaching. Soon after teachers' institutes were organized in many of the states, being provided for in most cases by statutory laws. The sessions are held annually, ranging from three days to four weeks, and the funds are supplied by the State or county, or are secured partly by a small admission fee of those in attendance. In most states the institutes are held under the direction of the county superintendent, who selects assistant instructors, subject to the approval of the State department of public instruction.

Many teachers' institutes partake of the nature of academic instruction and normal training, for which purpose a graded course of study covering three or four years is pursued systematically, the object being to induce consecutive study during the year. However, the principal object is to inculcate higher ideals of life and teaching, stimulate educational enthusiasm, and bring the teachers in contact with progressive methods and instructors of successful experience and recognized ability. In some instances a practice department or a roundtable program is provided, at which those in attendance either alternate in giving model lessons or relate their methods of teaching and discipline.

TEAK (tēk), a large tree of the vervain family, native to Java, Ceylon, and Southern Asia. It has large, ovate, opposite leaves, terminal panicles of white flowers, and round fruit about the size of cherries. The teak native to the East Indies attains a height of 200 feet, towering above other forest trees in the native woods. Its deciduous leaves are ten to twenty-four inches long and six to eighteen inches wide. It yields lumber resembling mahogany in appearance, which is not attacked by insects, and is used extensively in shipbuilding and for general construction purposes. The

African teak is an allied species and is frequently called African oak. The great durability of teakwood is due to an aromatic oil, which gives it a peculiar smell when freshly cut. A red dye is made of the leaves, which is employed in dyeing cotton and silk textiles.

TEAL (tel), the common name of a class of small ducks. They are very abundant and highly esteemed for the table. The teal duck of North America is found in large numbers throughout the region from the Atlantic to the western highlands, and in the spring migrates to breed in the regions far north. The bluewinged teal and the green-winged teal are the two common species. Both are rapid flyers and swimmers and dive with considerable skill. The body is about 15 inches long, with an alar extent of 25 inches. The color is grayish with markings of blue and green, and the head is slightly crested. Several species of teal ducks are native to Western Europe, among them the common teal. It migrates as far as northern Russia and Scandinavia in the spring, and in the fall returns to the Mediterranean and warmer regions of Europe and Africa. The male is brownish-red with various black and green markings, and the female is a dull-gray color. The Romans domesticated the teal duck for its flesh and eggs, and it is still reared on some of the smaller farms of Europe.

TECHNICAL EDUCATION, the training that has for its object improvement in the arts and trades. The term is commonly used to designate such instruction as is useful in pursuing the industrial arts or has for its object the special preparation for a vocation. Schools which make technical education a direct object are frequently divided into two general classes, those giving instruction in working trades, such as carpentry, watchmaking, tanning, decorating, engraving, and dyeing, and those which train for the commercial trades, which have to do with the retailing of glass, ceramic wares, etc. With the latter are included the trade schools that train craftsmen for practical work at any trade. Frequently a third class is considered as belonging to the schools that further technical education, embracing such as give particular attention to educate its students for superintendents and managers of industrial establishments, and for consulting and designing architects and engineers. Schools of this class are known by various designations, such as institutes of technology, engineering schools, polytechnical institutes, and schools of applied

Much instruction along the line of technical education is given in many colleges and universities that do not make training for the arts and trades a direct object, but the utility of preparing students especially along this line has become more generally accepted since trades are more closely organized and the branches of work in the industries have been diversified.

It cannot be said that this training was ever fully excluded from the larger institutions of learning, but its importance was especially emphasized at the International Exposition in London, in 1851, which revealed the superiority in all that relates to the application of arts and beauty to manufactures produced by the European nations. It was particularly noticeable that the countries of Europe which had facilities for special instruction designed to advance science, especially France, Germany, and Switzerland, displayed products which were superior in design and workmanship to those of countries not advanced in the means to extend education in the arts and sciences. The more recent expositions, including those at Buffalo, Saint Louis, Portland, and Seattle, have given emphasis to the importance of this training, and it has come to be an established fact that a theoretical knowledge of principles is necessary in addition to mere manual dexterity and empirical insight.

Technical education in the highest degree must begin in the primary school and be based on general literary culture. The branches of study recognized as essential are drawing, chemistry, and geometry. Typical examples of schools in the United States are those that teach dyeing and extend knowledge of textiles, such as located at Lowell and New Bedford, Mass., and the School of Industrial Art of the Pennsylvania Museum, at Philadelphia. At Krefeld, Germany, is a famous institution which has taken up for study the subject of government control of public utilities, such as waterworks, gas and electric light plants, and street railways. This institution provides thorough instruction in the mechanism and pattern designing involved in weaving and of the chemistry and technology of dyeing. Other noted institutions of this class are the School of Silk Weaving, Zurich, Switzerland; the Advanced School of Weaving, Lyons, France; and the textile department of the Manchester Technical School, England. Schools in which carpentry and the building trades are taught are quite numerous in Austria and Germany, including those located at Cologne, Chemnitz, Munich, and Nuremberg, and the School of the Technological Industrial Museum, Vienna. Schools for training foremen and superintendents in mechanical industries are maintained at Angers, Châlons, and Lille, France. The courses in these schools vary from three to five years, and in many distinct instruction is provided for boys and girls.

Until recently schools of applied art were not numerous in Canada and the United States, but there is a growing sentiment in favor of training for the handicrafts. Many states have made provision for manual training in the public schools, either in special classes or by systematic instruction through the grades from the primary department to the high school.

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The Cooper Union of New York City is one of the most prominent institutions affording instruction preparatory for commercial pursuits and the working trades. Others of a similar class include the Drexel Institute, Philadelphia; the School of Industrial Art of the Pennsylvania Museum; the Maryland Institute, Baltimore; the Lowell School of Design, Boston; the Art Academy, Cincinnati; the Chicago Art Institute, Chicago; the New York Schools, New York; and a number of colleges which teach the essentials of agriculture and mechanical arts. In quite a number of cities night schools are maintained at which provision is made for those who are occupied during the day. The learned societies of America also include many associations that are maintained especially to extend knowledge of industrial arts. These include the American Institute of Mining Engineers, the Society of Naval Architects and Marine Engineers, the Society for the Promotion of Agricultural Science, and the Society for the Promotion of Engineering Education.

TECUMSEH (te-kum'se), or Tecumtha, an Indian chief of the Shawnees, born near the site of Springfield, Ohio, about 1768; slain



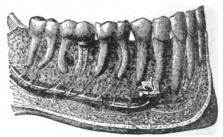
TECUMSEH.

Oct. 12, 1813. He was a brother of Elkswatawa, an Indian prophet of wide influence, and in 1791 led the Shawnee Indians on the warpath against the Kentucky militia. In 1805 he joined his brother in an endeavor to form a confederacy of the western Indians

against the whites, visiting for that purpose the region tributary to the Great Lakes and various parts of the Mississippi valley. His confederated band collected on the Upper Wabash River, while he was organizing the southern tribes near the Gulf of Mexico. Gen. W. H. Harrison met the Indians under Elkswatawa at Tippecanoe on Nov 7, 1811, and put them to rout. Tecumseh joined the British in the War of 1812 and aided them with his braves in Michigan, at the battles of Raisin River and Maguaga. His services being of value, he was made brigadier general, and at the siege of Fort Meigs had joint command with General Proctor. When Colonel Dudley led the Kentucky militia into an ambush, he protected the American forces from massacre. Subsequently he commanded at the Battle of Lake Erie, where he was slightly wounded, and on Oct. 12, 1813, led the right wing of the British forces at the Battle of the Thames. He had previously expressed the opinion that he would be killed in the battle and accordingly discarded his British uniform for the costume of an Indian warrior, fighting desperately until he was mortally wounded.

TE DEUM (tē dē'um), the first two words of the hymn beginning with the words, Te Deum laudamus, of which the English version is, "We praise thee, O God." The Latin hymn of this title is generally ascribed to Saint Ambrose and to Saint Augustine, but some authorities assign it to Hilary of Poiters. It is used extensively on occasions of triumph and thanksgiving and has engaged the genius of many musical composers. In the Anglican Prayer Book it forms part of the morning prayer. It is recited in the Roman Catholic Church on all Sundays, except those of Advent and Lent, as well as on numerous festivals.

TEETH, the hard, bony structures situated in the mouth or near the entrance to the pharynx of vertebrates, which are partially exposed when developed and employed for seizing and chewing food. They are hard and dense



PERMANENT TEETH OF LOWER JAW.

and in most mammals, when developed, consist chiefly of dentine or ivory invested on its upper surface and crown with enamel and at its base with cement. The roots of the teeth, embedded in the gum, have a small opening leading into the pulp cavity, through which numerous blood vessels and nerves penetrate. The teeth of most mammals are classified as incisors. canines, and grinders, though there is a vast difference in the structure and size, which depend largely upon the food and habits that characterize the animals. In the lion and other carnivorous mammals they are formed to serve in flesh eating, and in the ox and herbivorous animals they are designed more particularly for cutting off and grinding grasses. On the other hand, in some animals they are specially fitted to cut trees, as weapons of defense or means of anchorage, or to aid in constructing habitations.

Many species of fishes have compound teeth, and, whether simple or compound, they are shed and renewed at different stages of their lives. Birds have no teeth, but the name is applied to a notch in the bill in some species,

which is large and conspicuous among the birds of prey. Toads, turtles, ant-eaters, and tortoises have no teeth, but instead have a mouth constructed with a view to facilitate compressing and swallowing the food. Serpents have a form of teeth on the palate, aside from those on the jaw, but the poison fangs of venomous species are the most conspicuous. Some edentates, as the ant-eaters and pagolins, have no teeth, though they belong to the mammals. The two tusks of the elephant are modifications of the incisors in the upper jaw, but besides these it has one or two molars on each side of the two jaws. Naturalists have studied the teeth of extinct and living animals with such minuteness that they are able to determine the genus with much accuracy by examining the tooth structure and form. Teeth do not constitute a part of the skeleton, but, like the hairs, belong to the skin or exoskeletal part of the body.

HUMAN TEETH. Man and most mammals have 32 teeth when in the adult state. In man each half-jaw has eight teeth, those on corresponding sides being similarly shaped and arranged. There are two incisors in each halfjaw, situated nearest the middle of each jaw; the next one is called canine, or eyetooth; the next two, bicuspids; and the next three, grinders, or molars. The incisors and eyeteeth have one fang or root, while the others have two or three fangs. Children are born toothless, but soon begin to develop a temporary set of teeth, called milk teeth. The first to appear are the incisors, which begin to cut through the gums at about the age of seven months. The first molars appear at nine months and the canines at eighteen months, while the last of the molars do not appear until the age of two or three years. There are twenty milk teeth in all, the number consisting of eight incisors, four canines, and eight molars.

The first set of teeth is usually still perfect at six years, but the jaws contain the crowns of all the second set, except the wisdom teeth. At that age the crowns of the permanent set begin to press against the roots of the milk teeth, and the latter become slowly loosened and drop out. The last of the permanent set to appear are the wisdom teeth, which are some-times delayed until the age of 20 to 23 years. A dense substance resembling bone, called dentine, constitutes the greater part of the interior of the teeth. The crown of the tooth, which is exposed to wear, is covered by a protective sheath of *enamel*, a hard, white substance. It is the hardest of all animal textures and contains about 97 per cent. of mineral matter. The fang of the tooth is covered by a cement, which is formed of a layer of true bone. Within the tooth is a pulp cavity filled with a soft and highly vascular substance called the dental pulp. The roots of the teeth are set in sockets of the jawbone, which is lined with a membrane that forms a soft cushion.

Decay of the teeth results from portions of food being lodged between them and from a sediment called tartar being deposited, both tending to injure the teeth and to make the breath offensive. Dentine once broken off is not restored. An injury of this kind is soon followed by the tooth beginning to decay, which ultimately results in inflammation of the part containing the blood vessels and nerves, thus causing toothache and rapid wasting of the tooth structure.

TEGNÉR (těng-nâr'), Esaias, eminent poet, born in Kyrkerud, Sweden, Nov. 13, 1782; died in Wexiö, Nov. 2, 1846. He attended the public schools in the Vermland province until 1799, when he entered the University of Lund, graduating from that institution as master of arts in 1802. After serving there as tutor until 1810, he became Greek lecturer, and in 1812 was made professor and at the same time was ordained as clergyman of Stafje. His patriotic poem, "Sweden," won the prize at the Swedish Academy in 1811. In 1817 he published "Song to the Sun" and in 1824 completed "Frithiof's Saga, or the Story of Frithiof." He was made bishop of Wexiö in the same year and was a member of the national diet, representing the clerical party. His speeches and orations in connection with national legislation and public policy have a high repute in Sweden and Norway, many of them dealing with finance, literature, industrial development, and education. In 1840 he was stricken with temporary insanity at Stockholm, but, after taking treatment at an asylum in Schleswig, he recovered in 1841 and afterward wrote a number of productions. Among his writings not named above are "Iduna;" "Axel," a romantic poem; and "Kron Bruden," epical poem. "Frithiof's Saga" has been widely translated, a well-known translation of it into English being made by Longfellow. His "The Children of the Lord's Supper" is a fine work relating to moral practice.

TEGUCIGALPA (tå-gōō-sè-gäl'pà), the capital of Honduras, on the Choluteca River, about forty miles northeast of the Gulf of Fonseca. It occupies a site 3,375 feet above sea level and is surrounded by a fertile region, which has deposits of gold and silver. Among the most important buildings are the cathedral, a national university, several public schools, the government buildings, and a ladies' seminary. It has manufactures of clothing, machinery, and ironware. The city has a brisk inland trade. It was founded by the Aztecs and had some importance in the early history of Central Amer-

ica. Population, 1918, 28,645.

TEHERAN (tě-h'ran'), or Tehran, the capital of Persia, in the province of Teheran, 68 miles south of the Caspian Sea. The city is located on the southwestern slope of the Elburz Mountains, in sight of Mount Demavend, height 18,600 feet. It was long an inactive and poorly built city, but within recent years material im-

provements have been effected. The facilities include gas and electric lighting, street pavements, rapid transit, and a railroad line. the older parts the streets are still narrow and irregular, and many of the houses are low and plastered with mud. Among the principal buildings are the citadel-palace of the Shah, the arsenal, numerous bazaars, and the residences of foreign legations. Many beautiful parks adorn the public places, particularly the royal residences and the castle occupied by the kajars. Other features include the Mosque of Masjid-i-Shah and many public baths. The manufactures include linen goods, hats, clothing, carpets, shoes, and machinery. It has a considerable trade in live stock, fruits, cereals, and merchandise. The climate is exceedingly hot in the summer time, causing fully a third of the inhabitants to occupy villas in the highlands toward the north. Near the city are ruins of the ancient Rei, known in the time of Alexander the Great as Ragae, which is regarded the birthplace of Harun-al-Raschid. Population, 1916, 278,608.

TEHUANTEPEC (tā-wän-tā-pěk'), a town in Mexico, in the state of Oaxaca, fourteen miles from the Gulf of Tehuantepec. It is situated on the Tehuantepec River, which supplies water power, and has railroad connections with the Pacific and the Gulf of Campeachy. The region lying between the Gulf of Campeachy and the Gulf of Tehuantepec, an inlet from the Pacific, is known as the Isthmus of Tehuantepec and forms the narrowest part of North America, lying north of the Isthmus of Panama. It is 130 miles at the narrowest place. Several plans to construct a canal have been projected, utilizing the Coatzacoalcos River a part of the distance, but the project has been abandoned and a railroad line is now operated in its stead, thus supplying valuable transportation facilities between the Atlantic and the Pacific. The town of Tehuantepec has manufactures of indigo, salt, cotton fabrics, and machinery. Off the coast are valuable fisheries, including those of pearl fishing. It has a growing trade in cereals, live stock, and manufactures. Cochineal, fruits, cereals, and grasses are produced in the vicinity. The place was occupied by the Zapotec Indians at the time of the Spanish Conquest, but was captured by Alvarado in 1522. Population, 1916, 12,865.

TEKELI (těk'ě-lǐ), or Tököly, Emeric, Count of, eminent soldier and patriot, born in the county of Zips, Hungary, in 1656; died in Constantinople in 1705. He descended from a noble Lutheran family, receiving a liberal education, but the prominent part taken by his father in an endeavor to liberate Hungary from Austrian rule forced him to seek safety in Poland. The Austrian government confiscated his large estates in Holland, and, failing to get a peaceable settlement, he secured aid from the Prince of Transylvania and invaded Hungary with

20,000 men. The first battles in 1678 caused large numbers of Hungarians to join his army, thus enabling him to invade Austria, and in 1681 he compelled Leopold I. to grant concessions to the insurgents. Subsequently he secured support from Turkey and carried forward his former design of attaining the independence of Hungary. The markgraf of Baden defeated the Turks at Salankeman, or Slankamen, in 1691, and the latter sustained an overwhelming defeat at Zenta in 1697, thus compelling them to withdraw their support given to the Hungarians. Count Tekeli was soon after expelled from Hungarian territory and spent the remainder of his life in retirement in Turkey.

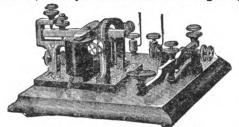
being reduced to extreme poverty.

TELAUTOGRAPH (těl-a'tô-graf), an instrument for reproducing by an electric current at a distance sketches and handwriting. The principal part consists of a transmitter and a receiver at each station, and the mechanism is so arranged that electrical current sent over the connecting wires puts the receiving pen in synchronous movement with the transmitting pen-Two lines of wire connect the transmitters and receivers of other stations, and power equal to that used in two ordinary incandescent lamps is taken from the electric circuit at each end. An ordinary lead pencil is used in the writing or drawing, but two silk threads are attached near its point to make the connection with the transmitter. The impulse is carried by means of the electric current to the receiving station, where the writing or drawing is reproduced in exact agreement with the copy made at the transmitting station. This instrument was invented by Elisha Gray. It is used for the conveyance of messages, in the coast defense service, on warships of the navy, for train dispatching, and in communicating between the news and press rooms of newspaper offices. It may be employed to good advantage in commercial work, since both the sender and the person addressed will have a record. No current is consumed when the transmitter is switched off. It is not necessary for an operator to be at a receiving station, since the writing is done true to the copy when the receiving pencil or pen is in place.

TELEGRAPH (těl'è-graf), an instrument to send messages by means of electricity, either at short or long distances. An instrument of this kind is frequently called the electric telegraph. The name telegraph is from the Latin tela = far, and graph = to write, meaning to write afar. This term was first applied because the original receiving telegraphic instrument had an electro-magnetic register, which recorded on a band of paper, in the form of dots and dashes, the signals sent over the line of wire. It was soon found that the operator could receive the telegraphic message by sound, even more readily than by the recorded dots and dashes received on the moving band of paper. This led to the

invention of a form of receiving instrument called the *telegraphic sounder*, which is now in almost universal use, though the instrument has been materially improved by successive inventors.

ELECTRO-MAGNETIC TELEGRAPH. Several essential and complicated parts enter into the electromagnetic telegraph. These include the battery, or source of electric power, the insulated wire by which the electric current is carried to any distance, the key or communicator for signaling



TELEGRAPHIC RECEIVER AND KEY.

between two places, and the sounder for receiving the messages at the station to which they are sent. A single wire is used to connect the two stations and is joined at each station to a key, a sounder, and a battery. It is necessary to have a complete circuit. This is secured by one pole of each battery being connected with the ground, and, when a current is sent along the wire, the circuit is completed through the earth. The circuit is said to be broken, or open, when the flow of electricity is cut off and closed, when it is allowed to go on again. In sending a dispatch the circuit is opened and closed successively by the operator who sends the message, by means of the key. The armature of the relay at the station where the message is received vibrates in unison with these movements, the sounder repeats them with greater force, and the second operator interprets their meaning.

In long telegraphic lines, when the current reaches the distant end of the line, it is too weak to produce an audible signal, or to form a satisfactory record. In such case an apparatus called a telegraphic relay is employed. This consists of an electro-magnet whose magnetizing coils contain many turns of fine wire. armature of the relay magnet serves to open and close the circuit of a local battery, the current of which operates either the sounder or the recording apparatus. It is possible by means of the relay to send telegraphic dispatches across a continent or ocean. Multitudes of applications have been made of the electro-magnetic telegraph, including the duplex telegraph, by which it is possible to send several messages at the same time over a single wire. In this system different sets of instruments are attached to the wire, each set corresponding to currents of different strength and being in communication with special batteries. Messages can be transmitted in this way without interruption for the reason that the instruments respond only to the batteries to which they are attached.

Many improvements have been made in the construction of telegraphic instruments, and extensive systems of wire lines are maintained in practically all countries. The Edison-Smith system of train telegraphy is one of the newer devices. By means of it a train in motion may receive dispatches from offices along the line, this being effected by induction from the telegraph wires along the line of railway and the communication is received by an instrument located in one of the cars. William Marconi, Nikola Tesla, and a number of other inventors added largely to telegraphic advancement by constructing instruments to communicate messages without wires, this system being known as wireless telegraphy. Another system, known as the Bonelli's telegraph, employs five wires and the messages are set up in brass type. However, it is too expensive to make it practical in commercial telegraphy.

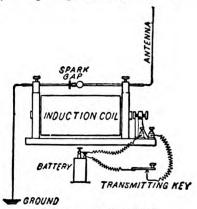
TELEGRAPH LINES. Telegraph wires are usually stretched upon high poles, but in some countries they are covered with a nonconductor, usually gutta-percha, and buried in the ground. A bracket is used to furnish ample facilities to attach the wires; but where from eight to twenty wires are employed in the same system two or more brackets are necessary. The attachment is made by means of glass knobs, since glass is a good nonconductor and prevents the escape of the current at the poles. Telegraph lines in Canada and the United States are owned by private corporations, who send messages for individuals at certain toll rates, but in most European countries the telegraph lines are operated by the government in connection with the postal system, thus giving the people a popular and efficient means of communication at low rates.

HISTORY. Practical efforts to send messages by the agency of electricity date from the early part of the 18th century, though the idea of using electric currents for that purpose is much older and was alluded to by writers of ancient times. The first practical results were obtained by stretching a series of wires and suspending from the ends a number of light balls marked with the letters of the alphabet, the electric current moving the particular ball against which it was directed. Such an instrument was perfected at Geneva, Switzerland, by Le Sage in 1774. Steinheil, of Munich, Germany, invented an electro-magnetic machine, in 1837, and Cook and Wheatstone, two Englishmen, in the same year secured a patent for a constant battery instrument. In the latter a keyboard was employed and needles were adjusted so as to point to the different letters under the proper impulse. Professor Morse is the inventor of the present commercial system of telegraphy. He constructed the first line over which a message was sent successfully at a long distance, the line being from Washington to Baltimore. The first message was, "What hath God wrought?" and was sent by him in 1843 to his assistant, Alfred Vail. The sum of \$30,000 was appropriated by the United States government to successfully

develop and apply the instrument.

The United States has the largest mileage of telegraph poles in the world, a total of 246,540 miles. These are controlled principally by two companies, the Western Union and the Postal Telegraph, the former having about 75 per cent. of the lines. Canada has an efficient telegraph service, a total of 48,775 miles, including several transcontinental lines. Russia has 105,800 miles; France, 93,600; Germany, 90,000; Australia, 50,000; Great Britain, 48,500; and Mexico, 36,000. See Cables; Telautograph.

TELEGRAPHY (tê-lĕg'rā-fˇy), Wireless, the art of telegraphing by electricity without wires. In theory it is closely allied to heliography, or signaling with flashes of light. The



WIRELESS TRANSMITTER.

light used is produced by electricity and is made up of very long waves, called Hertzian waves, and is invisible to the naked eye, since the waves vibrate too slowly to affect the retina. waves were named from the discoverer, Heinrich Hertz (1857-1894), a German physicist, who conducted experiments with spark discharges of the Ruhmkorff coil and Leyden jars in the period extending from 1886 to 1887. He found that when a spark leaped the gap between the terminals there were electric oscillations in these terminals sufficiently strong to produce magnetic waves in the surrounding space, which in turn caused similar oscillations in an adjacent conductor lying at an angle to them. The waves were detected by a device called a resonator, which consists of a circle of copper wire formed with a gap. The transmitter employed by Hertz was practically the same as is used at present, but the receiver has been greatly improved.

SYSTEMS. William Marconi, an Italian inventor, developed the pioneer system of wireless telegraphy by utilizing the discovery of Hertz. The first wireless message was sent across the

English channel in 1899, a system having been established in England by Marconi, and the first daily newspaper published on mid-ocean was issued Nov. 15, 1899, on board the steamer Saint Paul, containing news transmitted from shore by wireless telegraphy. Many systems are now in use, those employed chiefly in North America being the Marconi, Fessenden, and De Forest systems. The Popoff system is used most in Russia; the Slaby-Arco and Braun-Siemens-Halske, in Germany; the Fissot, Branley, and Rochefort, in France; and the Marconi, Lodge-Muirhead, and Orling-Armstrong, in England. In 1903 the government of Italy voted \$160,000 to establish a transatlantic system of wireless telegraphy. Wireless outfits are carried by all modern warships and by many steamships. The advantages of wireless communication were greatly emphasized in the naval operations during the Russo-Japanese War and at numerous times while the Revolution of 1905 was raging in Russia. Intelligible messages were sent as early as 1901 from Cornwall, England, to Newfoundland, a distance of 1,800 miles.

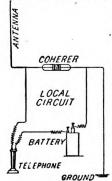
APPARATUS. The accompanying illustrations give a fairly clear idea of the mechanical construction of the instruments employed. In typical wireless telegraph stations, both transmitting and receiving, the vertical wire, called the antenna, is mounted on a tower about 100 feet high. Frequently a series of wires is used. In some instruments the receiver is supplied with a telephone, while others transmit the sound in the manner of an ordinary telegraph, or record

the messages in telegraphic characters.

Messages are transmitted by operating a telegraph key according to the Morse code in the primary circuit of the induction coil (see transmitting key), which causes sparks to leap at corresponding intervals at the spark gap. illustration.) Signals induced in this way are transmitted by the Hertzian waves to the receiving station, where the telegraph receiver records them, or they may be perceived by holding the telephone to the ear (see illustration), though in most instruments the Morse alphabet, made by combinations of long and short signals, is utilized through the agency of a recorder or receiver. Much improvement was made by Marconi when he increased the sensitiveness of the coherer, but there are in use many types of wave detectors, though they are all based largely on the principle of the imperfect contact, the Marconi magnetic detector being an exception. Inventors are still at work in an effort to develop a system which will not allow interference between two or more equipments. Such a system is quite essential, since it would prevent unauthorized persons from reading and intercepting the messages. The purpose is to tune or syntonize the transmitting and receiving stations with the view of perfecting instruments that will give and respond to oscillations of a certain periodicity only. Although many patents have

been granted to inventors who claim to have made improvements so the desired result can be secured, complete success in syntonizing had not been obtained up to 1909.

In order to better understand the mechanical parts of equipment for wireless telegraphy, the following is given with the suggestion that it covers the essentials of most instruments: A vertical wire called the *antenna* is connected to one terminal of the coil, and the other terminal is connected with the earth, the purpose being to increase the electrical capacity of the terminal rods and produce larger waves. Instead of producing the oscillations by means of an induction coil, they are now ordinarily produced by a dyna-



mo and a step-up transformer, except for telegraphing over short distances. But even with these changes we would not be able to telegraph over any appreciable distance if dependent upon the Hertz resonator for receiving a message, for, owing to the fact that the waves spread out in all directions from the transmitting antenna, the receiving antenna is acted upon by a very small pro-

WIRELESS RECEIVER. upon by a very small proportion of the power expended by the transmitter, and this proportion decreases very rapidly as the distance between the transmitter and the receiver increases. In order, then, to detect the rays at long distances, a very sensitive instrument called the *coherer* has been invented.

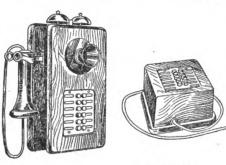
The coherer in its usual form consists of a glass tube with two metal pistons fitted therein between which a quantity of nickel filings is placed. The latter form an imperfect electrical contact between the pistons, and take the place of the spark gap in the receiving antenna. When the oscillations are set up in the antenna by the Hertzian waves, due to their high pressure or voltage, they break through the imperfect contact of the coherer, causing the filings therein to cohere or string together and thus produce a much better electrical path through the

coherer. The action is microscopic and cannot be detected with the naked eye. However, the coherer, aside from being a part of the antenna circuit, is also made a part of a local battery circuit, which contains a telegraph receiver, and, whenever the electric oscillations open a good path through the filings for the local circuit, the telegraph instrument will be energized by the local battery only. In order to break this path after the oscillations have ceased, or, in

other words, to cause the filings to decohere, they are constantly jarred apart by means of the tapper, which is in reality an electric bell with the gong removed, the clapper striking the coherer tube instead. Carbon granules may be substituted for metallic filings, and in this case no tapper is necessary, the coherer being self-restoring.

TELEMACHUS (tė-lěm'ā-kus), in Greek mythology, the son of Ulysses and Penelope. He was an infant at the beginning of the Trojan War and was left in charge of Mentor, a trusted friend of Ulysses. After the close of the war, he was accompanied by Mentor in search of his father, whom they found as a beggar at the hut of a swineherd in Ithaca. After the identity of Ulysses was made known to the son, they formulated a plan to slay the insolent suitors of his mother, Penelope. After some of the insolent suitors had been slain and others were driven from the place, the surviving suitors conspired to kill the youth, but he was enabled to escape through the aid of Minerva. It is related that he afterward removed to the island of Aeaea, where he married Circe, the fabled sor-

TELEPHONE (těľé-fōn), an instrument for reproducing sound at a distance by the transmission of impulses through the agency of electricity over a conducting wire or cord. The three essential parts of a telephone include the *transmitter*, by which sound waves generate or modify an electric current; the *line*, by which the current is transmitted to the distant station; and the *receiver*, through which the current produces sound waves. In the common form of the telephone a transmitting and a receiving instru-





Wall Type.

Desk Type.

ment are employed at each end of the line. A strong bar magnet, provided with a coil of insulated wire wrapped around it near one end, is connected at one of its ends to a wire which passes to a distant station, where it is connected to one end of a similar cord wrapped around a magnet of the same kind. The other end of the insulated wire is connected with the ground, thus providing a complete circuit, called a telephone circuit. A thin disc of sheet iron is fixed

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in front of the extremity of the magnet. As the mouthpiece of the transmitting instrument collects and concentrates the sound, the sheet iron is caused to vibrate, and electric currents corresponding exactly to the original sounds are thereby excited. A person holding the receiver to the ear at the other end of the line is enabled to perceive a reproduction of the original sounds, for the reason that the electric currents, coming against the plate or disc in the receiving telephone, produce corresponding vibrations. The reproduction is so true that the voice of the speaker can be readily recognized at a distance of many hundred miles. In the accompanying figure a sectional view of the telephone is shown.

The ancients understood the laws on which the telephone is based, but the invention of practical instruments to successfully utilize them in



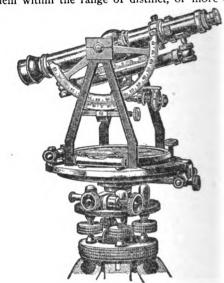
SECTION VIEW OF TELEPHONE.

long-distance communication dates from the 19th century. Philip Reis, of Friedrichsdorf, Germany, constructed a telephone in 1861 and was the first to apply the name by which it is known. This he did before the Physical Society of Frankfort. Elisha Gray, of Chicago, completed a short distance telephone in 1873. However, Alexander G. Bell, of Boston, Mass., was the first to invent a telephone that carried the human voice with perfection a long

distance. He exhibited his instrument in 1876. Shortly after, Thomas A. Edison and others made notable improvements. The telephone came into general use with remarkable rapidity, not only in cities and towns, but it is in extensive use in country districts. In 1916 the wireless or radio telephone was greatly improved, enabling the operators to talk from 2000 to 5000 miles without the use of wires.

The systems of telephones now in use enable people in cities and many in rural districts to communicate with each other, thus greatly facilitating rapidity and convenience in social and business communication. Long-distance telephones are likewise numerous. The first line of material length was completed, in 1895, between New York and Chicago, which is about 950 miles. Long distance lines are maintained between Paris and London, between Paris and Berlin, between Berlin and Vienna, and between many other capitals and cities of Europe. Michael I. Pupin, of Columbia University, in 1891 announced the invention of a device for overcoming the resistance long experienced in ocean telephoning. He placed at regular intervals along his cable an induction coil around the parent wire. The current, which can be very weak, starts from the remitter, and just as it begins slightly to weaken strikes one of these induction coils, which strengthens the current and gives it renewed impetus, and, so pushed on its way, the current leaps from coil to coil according to well-known electrical laws. Relays serve the same purpose in long-distance telephoning and in telegraphing.

TELESCOPE (těľé-skōp), an optical instrument to magnify distant objects and bring them within the range of distinct, or more dis-



TELESCOPE MOUNTED FOR USE.

tinct, vision. It consists essentially of two parts, an object glass, or mirror, for forming an image of the object, and an ocular, or eyepiece, for receiving the image. The telescope assists the eye in two ways, by magnifying the image of the objects viewed, and by collecting and concentrating upon the eye a greater amount of light than would enter the organ if unassisted. It may be taken as a general rule, that the larger the object glass, the greater in both respects is its power. The object glass is convex, and the eyepiece is either convex or concave. In the former case the image appears inverted, and in the latter case it appears to the eye in its natural position. Eyeglasses are always concave in terrestrial telescopes, as opera glasses and spy glasses, but in astronomical telescopes they may be of either form, since the object to be viewed has a spherical shape. Telescopes are either re-fracting or reflecting. The former transmit the rays to a focus through a combination of lenses called the object glass, while the latter bring them to a focus by reflection from a concave mirror. Thus, an observer looking through the eveglass of a refracting telescope views the image itself, but one using a reflecting telescope views a reflection of the image made by the mirror.

The reflecting telescopes have very large object glasses, and to them are due the most important discoveries made in astronomical science. The largest reflecting telescope in the world is that

of Lord Rosse at Parsonstown, Ireland, which has a speculum six feet in diameter. Other large instruments of this class include the William Herschel telescope and the one erected by Ainslie A. Common near London. Both of these are smaller than the Rosse instrument, but they are more perfect in their effect. The Lick Observatory in California has a refracting telescope with an object glass three feet in diameter. It was long the largest in the world, but it is surpassed in size by the Yerkes telescope at Lake Geneva, Wisconsin.

The Yerkes telescope belongs to the Chicago University, being a gift of Charles T. Yerkes, and is now the largest in use. Its object glass measures forty inches in diameter, is about three inches thick, and weighs 762 pounds. The sheetsteel tube is 63 feet long, the largest diameter being 53 inches, and the weight of its three sections is six tons. The estimated cost of the lens is \$100,000, and of the telescope and the observatory, \$500,000. Although the telescope has a power considerably greater than that of the Lick instrument, its location is less favorable on account of being on lower ground, thus giving it a more misty atmosphere. Other noted refracting telescopes include the one at the Washington Naval Observatory, 26 inches; at Vienna, 27 inches; at Yale University, 28 inches; and in Pultova, Russia, 30 inches. Among the men connected with the history and development of the telescope are Gerbert of Auvergne, Roger Bacon, Galileo, Kepler, Liebig, Newton, Herschel, and Peter Andreas Hansen (1795-1874).

TELL, William, celebrated hero and patriot of Switzerland, who, according to historical accounts, rescued his native land from Austrian oppression in the 14th century. He belonged to the canton of Uri, which had joined Schwyz and Unterwalden in a confederacy against Gessler, the resident governor under Austria. The latter was noted for his haughty and tyrannical disposition, and, among other requirements, insisted that all persons passing the market place of Altdorf should remove their hats while opposite a long pole, on which he placed the ducal hat of Austria. Tell and his son, refusing to obey the mandate, were taken before Gessler, who ordered that Tell should shoot an apple from the head of his son, but in the event of missing it the death punishment should be inflicted upon him. This feat he accomplished without injury to the boy, but he had concealed an arrow with which to shoot Gessler, in the event that the apple had been missed or the boy had been injured. He was accordingly imprisoned a second time and conveyed across Lake Lucerne, but on nearing the shore leaped from the boat and escaped, and soon after freed Switzerland by sending an arrow through the heart of Gessler. An extended war between Albert I. of Austria and the Swiss peasants soon followed, hostilities continuing, with intervals of peace, for nearly 200 years, or from 1307 until 1499, when a prolonged peace was concluded. The most prominent battle in which Tell took part is that of Morgarten, in 1315, and it is said that he was drowned in the Schächen River, in 1350, while trying to rescue a friend. Though much attributed in history to Tell appears fabulous, many circumstances indicate that such a man lived and rendered services in securing the independence of Switzerland. Schiller made the story popular by his well-known drama, "William Tell."

TELLER, Henry Moore, public man, born in Allegany County, New York, May 23, 1830. After studying law and practicing in New York, he removed to Illinois in 1850, and in 1861 settled in Colorado. He was elected to the United States Senate in 1876, and in 1882 became Secretary of the Interior under President Arthur. In 1885 he was again elected United States Senator and was reëlected in 1891, in 1897, and in 1903. Teller delivered many able addresses on the floor of the Senate and served on a number of leading committees. He died Feb. 23, 1914.

of leading committees. He died Feb. 23, 1914. TELLURIUM (těl-lū'rĭ-ŭm), a nonmetallic element belonging to the same class as sulphur and selenium. It occurs native in small quantities and is found in a number of minerals, especially in California, Virginia and Hungary. This element is crystalline, white, and shining, and burns with a strong flame. The flame is blue with green edges, and while burning it gives off a thick white smoke. See Chemistry.

a thick white smoke. See Chemistry.

TEMISKAMING, or Temiscaminque, a lake of Canada, on the border between Ontario and Quebec. It is 80 miles long and is well stocked with edible fish. The Ottawa River flows through this lake.

TEMPE, a narrow valley in northern Greece, through which flows the Peneus River. It is situated between Mount Olympus and Mount Ossa, in Thessaly. Both ancient and modern poets have praised its beautiful and romantic scenery, and tourists speak of it as a region of remarkable grandeur. In places the valley narrows so as to leave passage only for the river and a carriage road, and in several localities are ruins of ancient castles and fortresses.

TEMPERANCE. See Total Abstinence. TEMPERANCE (tem'per-ans), Sons of, an organization to promote temperance, founded in New York in 1842. Both men and women are eligible to membership, and a cadet branch is maintained for boys who are not under sixteen years of age, who are designated as Cadets of Temperance. Those who join are required to sign a pledge not to use alcoholic drinks or engage in the sale or manufacture of spirituous The order has branches in Australia, Canada, Great Britain, and the United States. About half of the members are in the last mentioned country, where a membership of 3,000,000 This organization has life insuris reported. ance and sick and funeral benefits.

TEMPERATURE (těm'pēr-à-tûr). See Thermometer.

TEMPERATURE, the condition of any body with regard to heat or cold. Animal temperature has reference to the state of the body of animals with regard to heat, though this applies only to warm-blooded species during life. The source of heat in animals is found in the potential energy of the food and the oxygen which is absorbed from the air during respiration. In the healthy human adult the temperature ranges from 97.5° to 99° Fahr., and the normal state is usually close to 98°. In early infancy as well as in old age, the temperature is slightly above the average, but it is influenced but slightly by race, though the people who reside in the tropical regions have a temperature averaging about one-half a degree higher than those of the Temperate zones. At the surface the body is slightly cooler than in the interior. and it is somewhat higher immediately after meals and during exercise. In fevers the temperature rises to 106°, and registrations below 93° and above 106° are usually fatal. When the body has a temperature of 100°, the pulse beats 80 times per minute. See Climate.

TEMPERING, the process of producing a determined degree of hardness in metals, especially iron and steel. Hardness is that property by which certain substances resist being worn or scratched by others. However, the terms hard and soft are used only in a relative sense, since a body may be hard as compared with one substance, but soft when compared with another. Thus, glass is considered hard when compared with marble, but it is soft as compared with the diamond, since it is scratched or cut by the diamond. Steel possesses the property of being easily hardened or tempered, and it is possible to obtain almost any degree of hardness and brittleness in this metal. The process consists in plunging the steel, when raised to a red heat, into cold water or some other liquid, which will cause it to become hard. To temper it properly for the purpose desired, as in making knives and razors, it may be made excessively hard and then reduced by gradually reheating. Hardness in steel is indicated by its color. Razors and surgical instruments are made from steel heated to about 450° and then plunged into cold water or oil, when it assumes a pale straw color.

TEMPLARS (tem'plerz), or Knights Templar, an order of knights founded at Jerusalem in the beginning of the 12th century, celebrated alike for its religious and military influence. Nine Christian knights were the founders, of whom the chief ones were Hugues de Payens and Geoffrey de Saint Omar, and the object was to protect the Holy Sepulcher and its visitors. Baldwin II., King of Jerusalem, accommodated them by allowing them to occupy a part of his palace, and the abbot and canons of the church and convent of the temple gave them a building wherein to keep their arms, whence they were called *Templars*. The order was confirmed in 1128 by Pope Honorius II. They were enjoined

to wear a red cross on the left breast and on their banners by Eugenius III., in 1146. The Templars exercised a wide influence in Palestine until Jerusalem was captured by the Saracens in 1187, when they retired to Antioch, then to Acre, and finally transferred their seat to the island of Cyprus. Pope Alexander III. had already conferred extensive privileges upon the order in 1162, which included regulations that gradually increased their numbers, and they became very numerous in all the countries of Southern and Western Europe, establishing themselves in England about 1185.

The Templars gradually attained to great wealth and influence, including some of the leading families of Europe, and at one time had designs upon European thrones, with the view of establishing a nationality. Philip the Fair of France lured Jacques D. Molay, master of the temple, to Paris in 1306 with the view of suppressing the order in France, and the following year placed all the leaders under arrest. Pope Clement V. issued a bull calling upon Christian princes to aid in examining the Templars as to piety and morality, and a general council at Vienna, in 1311, abolished the order as heretical. Many of the leaders were prosecuted and put to death for alleged crimes, while their wealth was confiscated and their meetings were prohibited. In France the treatment accorded the Templars was highly unjust, and they were served no better in England under Edward II. They received just and mild treatment in Germany, where they maintained themselves longest. Much of the property belonging to the Templars was bestowed on the order of the Knights of Saint John, which was joined by many of the members after the main organization had been abandoned.

TEMPLE, a building designed for religious worship. In some countries the term is used synonymously with church and even with mosque, but it has special reference to the chief sanctuary of the Jews, the Christian churches constructed by the Knights Templar, the Protestant places of worship in France, and the edifices erected in various pagan countries. Solomon, King of the Jews, built the most remarkable temple in the historic period of the world. It was located on Mount Moriah, in Jerusalem, and was constructed of stone and the cedar of Lebanon. The length was 60 cubits; the width, 20 cubits; and the height, 30 cubits. It was divided into two parts, the outer sanctuary or Holy Place, and the Holy of Holies; the former was 20 by 40 and the latter 20 by 20 cubits. Within the Holy Place were the showbread table, the altar of incense, the seven-branched candlesticks, and ten smaller tables and candlesticks. The Holy of Holies contained the Ark of Testimony, sheltered by the outspread wings of two cherubs. Nebuchadnezzar destroyed the temple in 586 B. C., but the Jews erected a new edifice on the same site after returning from the Babylonian captivity, in 516 B.C. It was rebuilt by



RUINS OF THE TEMPLE OF ISIS ON THE ISLAND OF PHILAE, EGYPT. Notice that the River Nile surrounds the island.



Herod the Great in 18 B. C., and his structure was the one from which Christ expelled the merchants and money changers. It remained intact until 70 A. D., when it was completely destroyed by the Romans. In the time of Constantine the Jews sought to rebuild the temple on the same site, and another attempt was made by Julian, but both attempts proved futile. The ground is now occupied by a Moslem place of worship, known as the Mosque of Omar.

Temples were very common in Greece and Rome. They were dedicated to some particular deity and in them the priests officiated and burned incense. Indeed, these edifices were the principal architectural features of most ancient peoples. Many of the ruins in Egypt, Greece, Rome, and even China give evidence that these structures were of large size and contained the greatest treasures of ancient civilizations. Temples of considerable note are found in China and other countries of Asia, and in form they do not differ materially from the ancient style. See Pagoda.

TEMPLE, a city of Texas, in Bell County, about 112 miles south of Fort Worth, on the Missouri, Kansas and Texas and the Gulf, Colorado and Santa Fé railroads. The surrounding country is fertile. The features include the public library, the high school, an academy, two hospitals, and extensive railroad shops. Among the manufactures are cotton textiles, earthenware, cigars, clothing, and machinery. It is a market for cereals, live stock, dairy products, and merchandise. Electric lighting, pavements, waterworks, and sewerage are among the improvements. It was settled in 1881. Population, 1900, 7,065; in 1910, 10,993.

TEMPLE, Frederick, Archbishop of Canterbury, born at Leukas, in the Ionian Islands, Nov. 30, 1821; died Dec. 23, 1902. He was educated at Baliol College, Oxford, and in 1846 was ordained for the ministry. In 1848 he was made principal of the training college at Kneller Hall and became head master at Rugby in 1855, where he administered successfully for eleven years. He was appointed bishop of Exeter in 1869, bishop of London in 1885, and Archbishop of Canterbury in 1896, and the following year wrote a learned and dignified reply to the papal decision that declared invalid the ordination of the Church of England. In 1901 he officiated at the coronation of Edward VII. His publications include "Reviews and Essays," "Sermons Preached at Rugby Chapel," and "Relation Between Science and Religion."

TENACITY (te-nas'i-ty), the power of a substance to resist being pulled apart. It is due to the cohesion of the molecules, hence tenacity varies greatly in different substances. The length of a bar or beam does not affect the number of molecules in the area of a given cross section. However, a long beam is likely to have a flaw or weak spot, hence it may be less tenacious than a short beam, since it inclines to break at its

weakest part. Wood is more tenacious in the direction of its fibers than in the transverse direction, while metals usually have greater tenacity in the longitudinal direction. In most cases the simple metals have less tenacity than those which are mixed.

TENANT (těn'ant), one who holds or possesses real estate temporarily, the title of which is vested in another, who is known as the landlord. Such an occupant usually has possession under the terms of a lease, whereby the relation of the landlord and tenant is created. If an occupant has possession on no fixed terms, though with the will and knowledge of the landlord, he is said to be a tenant at will. Where two or more persons have possession of lands or tenements, each is called a tenant in common. The term tenant for life is applied to one whose possession is dependent upon his own life or that of another

TENCH, the name of a fish of the carp family, found in the fresh waters of Europe and Asia. It is soft-rayed, rarely is more than 14 inches long, and has a yellowish-brown color. The tench prefers stagnant waters with a muddy bottom, and the winter is spent in a torpid state in the mud. It is tenacious of life and its flesh is not prized as a food.

TENDER (těn'der), an offer to do an act which one person is legally bound to perform for another. The obligation as well as the offer may be to pay money or to deliver special articles. If the tender be of money, it is effectual only when the demand is one of money and the amount tendered is adequate. When a person makes a tender of lawful money to discharge a debt, it is termed a legal tender. Usually the law specifies what constitutes a legal tender. Silver coins in denominations of less than one dollar constitute a legal tender for ten dollars or less in the United States. Silver coins in the denomination of one dollar and all classes of gold coin are legal tender for any amount, which is true also of United States bank notes. However, bank notes are legal tender only for private debts and certain other debts, but not in payment of interest on the public debt or as duties on imports.

TENDON (těn'dǔn), in anatomy, white fibrous tissue which connects the end of a muscle with the bone that it is intended to move. Some tendons are formed like a broad ribbon, others are cylindrical, and still others are thin like a sheet. A tendon is not elastic nor extensible, and thus transfers immediately the motion imparted by the contraction of the muscle to the bone into which it is inserted. In many cases the tendons are long and slender, as those extending from the muscle in the upper part of the forearm to the fingers.

TENERIFFE (ten-er-if'), an island of the Canary group, one of the largest and most productive. It is situated about 150 miles northwest of Cape Bojador, Africa. The contour resem-

bles that of a triangle, with the two longest sides sixty miles long and the western side about twenty miles. The area is given at 785 square miles. Most of the coasts are high and characterized by deep inlets, and the surface is diversified by plains, valleys, and mountains. The highest elevations are from 8,000 to 12,000 feet above the sea, Mount Teneriffe being the culminating summit. The island is volcanic and vapors rise constantly from some of the craters. Among the chief products are nuts, cochineal, cereals, silk, grasses, and fruits. Live stock, such as horses and cattle, is grown successfully. The island belongs to Spain, with which country it has a considerable commerce. Santa Cruz and Laguna are the chief seaports. Population, 1916, 137,620.

TENIERS (těn'yērz), David, called the younger, eminent painter, born in Antwerp, Holland, in 1610; died Feb. 11, 1690. He was a son of David Teniers (1582-1649), an eminent Flemish painter, under whom he received instruction in drawing and painting. Later he studied under Adrian Brouwer. He is considered superior to his father as a painter of scenes and incidents in rural life, and is noted for his success in historical and landscape painting. Among the distinguished personages patronizing him were Queen Christina of Sweden, Don John of Austria, Archduke Leopold, and the Prince of Orange. His paintings are very numerous, including fully 1,000, and many take high rank

for their trueness to nature, artistic coloring, and exactness in execution. A group of ladies and gentlemen painted by him in 1630 is in the Berlin Museum. Other paintings of note are in the Munich Gallery, the Brussels Museum, and the Gallery in Saint Petersburg. Among the

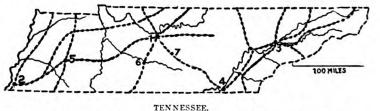
most noted of his paintings are "The Prodigal Son," "The Five Senses," "The Village Wedding," "The Bagpipe Player," "Jubilee Meeting of the Civic Guards," and "Heron Shooting."

TENKATE (těn-kä'te), or Kate, Jan Jacob Lodewijk, poet and clergyman, born at The Hague, Holland, Dec. 23, 1819; died in 1889. He first studied in his native city and afterward took a course in theology at the University of Utrecht, receiving a ministerial charge on the Marquesas Islands in 1845. In 1847 he settled in Amsterdam, where he exercised an extensive influence both as pastor and poetical writer. His poetical writings are numerous, including three collections, entitled "Roses," "Flowers," and "Poesie." "Italian Travels" is a work in prose. He translated Milton's "Paradise Lost," Thomson's "Seasons," La Fontaine's "Fables," and the "Book of Job."

TENNESSEE (těn-něs-sē'), a southern State of the United States, the third to be admitted after the adoption of the Constitution, popularly called the *Big Bend State*. It is bounded on the north by Kentucky and Virginia, east by North Carolina, south by Georgia, Alabama, and Mississippi, and west by Arkansas and Missouri. The length from east to west is 432 miles, and the greatest width is 109 miles. It has an area of 42,050 square miles.

DESCRIPTION. The flood plain of the Mississippi is located in the western part of the State, and between it and the narrow valley of the Tennessee is an extensive ridge running north and south, which is diversified by fertile valleys and plains. Between the Tennessee Valley and the Cumberland Mountains, in the eastern part, is a valley region about 100 miles wide, whose surface is of a gently undulating character, with small elevations in many places The Cumberland Mountains range about 1,000 feet above the Tennessee River, and between them and the Chaka and Smoky mountains is a valley more or less diversified by minor elevations, including ranges of the Unaka, Bald, and Stone mountains. This region contains many caverns and numerous subterranean streams. The Smoky Mountains have a general elevation of 5,000 feet, but many of the peaks are much higher. Klingman's Dome, height 6,663 feet, is the highest summit in the State.

The drainage belongs entirely to the Mississippi system, but the only rivers of considerable



1, Nashville; 2, Memphis; 3, Knoxville; 4. Chattanooga; 5, Jackson; 6, Columbia; 7, Murfreesboro. Chief railroads shown by dotted lines.

size that discharge directly into the Mississippi are the Obion and the Big Hatchie. These flow in a general direction toward the west, where the Mississippi forms the entire western boundary, while the Ohio forms all of the northern border. The Cumberland enters the State from Kentucky and flows toward the southwest until it passes Nashville, when it recrosses the Kentucky border in Stewart County. The Tennessee River is formed in the eastern part of the State by the Clinch and Holston rivers, both of which rise in Virginia, and crosses the southern border into Alabama and Mississippi, but reënters the State in Hardin County and flows across it into Kentucky. The French Broad is a tributary of the Holston River, which it enters a short distance above Knoxville. No lakes of material size are within the State, except the lagoons in the Mississippi flood plain. These include Reelfoot Lake, which is 5 miles wide and 25 miles long.

The climate is mild and favorable, but varies

considerably on account of differences in altitude. In the western lowlands it is less healthful than in the remainder of the State. The mean temperature for July is 77° and for January 38°. While the thermometer falls below zero in the mountains, the minimum in the State generally is seldom lower than 10°, and the maximum is about 104°. Chattanooga has a mean temperature of 59°. Rainfall is abundant in all parts of the State, ranging from 47 inches in the eastern to 50 inches in the western section, but it frequently reaches 60 inches in some localities of the central part.

MINING. The State has extensive mineral resources and the output of various minerals has grown constantly the past decade. Coal is mined in the counties lying west of the upper Tennessee River, and the annual yield is about 6,850,000 tons. In the output of iron ore, the State holds fifth rank. Phosphate rock is obtained in large quantities in the north central part of the State, in the vicinity of Nashville. There has been a constant increase in the output of copper Building stone, such as granite and limestone, is quarried in many parts of the State for building purposes. Mineral waters, glass sand, and commercial clays are widely distributed. Other minerals

include zinc, petroleum, natural gas, and mineral

paints.

AGRICULTURE. Farming is the chief occupation. The farms average ninety acres, about oneseventh of which are operated by Negroes. The Cumberland plateau is not well suited for agriculture, but all other parts of the State possess fertility, especially the rich alluvial lands of the Mississippi bottom. Corn is grown on a larger acreage than any other cereals, and in the yield of this crop the State usually holds tenth rank. Wheat is the second crop in acreage and is followed in order by hay, cotton, and oats. Other important crops include tobacco, peas, potatoes, peanuts, rye, sweet potatoes, and sorghum. Fruit culture is the source of a large income, especially apples, strawberries, peaches, pears, and watermelons. Large interests are vested in the live-stock industry, especially in cattle and swine. Special attention is given to the rearing of fine grades of horses and mules, and sheep and poultry are represented in large numbers. More than one-third of the cattle are reared for dairy purposes.

Manufacturing. The progress in manufacturing enterprises has been very noticeable the past ten years, both in the quantity and variety of the output. The State is well supplied with commercial timber, such as hickory, beech, pine, ash, walnut, elm, sycamore, and other classes that are useful in the industry. It has an abundance of coal and minerals to stimulate this industry. Flour and grist-mill products have long held the first place among the manufactures, but they are followed closely by both timber and machine-shop products. Manufacturing of this class is greatly facilitated by numerous navigable streams and rivers that furnish abundance of water power. Other manufactures that take high rank include tobacco products, cotton and woolen goods, paper, pottery, leather, railway cars, cotton-seed oil, and farming machinery Large iron ore smelters, stone quarries, and sorghum molasses plants are operated.

TRANSPORTATION. The State has extensive navigation facilities on the Cumberland, the Mississippi, the Ohio, and the Tennessee rivers. These navigable highways furnish direct communication with many ports on the Atlantic and the Gulf of Mexico. The railroad lines aggregate 4,500 miles, and considerable facilities are furnished by electric railways that extend into rural districts from the larger cities. The principal railroads within the State are the Illinois Central, the Southern, the Louisville and Nashville, and the Nashville, Chattanooga and Saint Louis. Among the exports from the State are coal, tobacco, lumber, iron and steel products, flour, and cereals. Nashville, Memphis, Chattanooga, and Knoxville are the leading commercial, railway, and manufacturing centers.

GOVERNMENT. The present State constitution was adopted in 1870. It vests the chief executive power in the Governor, elected for two years by the people. The secretary of State and the treasurer and comptroller of the treasury are elected by the Legislature, the former for four and the latter for two years, while the attorney general is appointed for six years by the judges of the supreme court. Educational work is supervised by the superintendent of public instruction, who is appointed by the Governor for two years and is confirmed by the senate. Five judges constitute the supreme court, and the term of service is eight years. The State is divided into circuit, chancery, and other court districts, and judges of these courts are elected by the people. Local government is administered in the counties, municipalities, and townships.

Education. A constant growth in educational work has been realized the past quarter of a century. In the decade from 1890 until 1900 the rate of illiteracy was reduced from 38.7 to 20.7 per cent. This wholesome, progressive development has continued to increase steadily. At present the illiteracy among native white people is 14.2 per cent. and among the colored inhabitants it is 41.6 per cent. The system of public schools is maintained by State and local aid, and the work is under the supervision of the State superintendent of public instruction, who is nominated by the Governor and confirmed by the senate. In 1907 the Legislature passed a law which makes the county the unit of school organization instead of the school district. A board of five members has general charge of the schools in each county. This board is presided over by the county superintendent, who is the ex officio secretary, and the effect has been to increase the salary of teachers, consolidate many of the schools, and extend the length of the term. The State has about forty high schools of the first class and many graded schools, but the system provides for separate instruction for white and colored pupils. Normal instruction is given at the Peabody College for Teachers, at Nashville, and a number of other institutions.

The University of Tennessee, situated at Knoxville, is at the head of the educational system. Other institutions of higher learning include the Fisk University, Nashville; the Grant University, Athens; the Vanderbilt University, Nashville; the Maryville College, Maryville; the University of the South, Sewanee; the University of Nashville, Nashville; the Burritt College, Spencer; the Southwestern Baptist University Jackson; and the Christian Brothers' College, Memphis. The State institutions are subject to investigation by a board of charities, which is appointed by the chief executive. Three hospitals for the insane are maintained, being located respectively near Bolivar, Knoxville, and Nashville. Knoxville has a school for the deaf and Nashville has institutions for the blind and for teaching the industries. A Confederate soldiers' home is situated near Nashville. The principal prison is likewise near Nashville. Many of the prisoners are required to work in the mines.

INHABITANTS. The population is about fifty to the square mile, and only 17,746 are of foreign birth. Nashville, on the Cumberland River, is the capital and Memphis is the largest city. Other important cities include Knoxville, Chattanooga, Jackson, Clarksville, Columbia, Johnson City, Murfreesboro, Union City, and Bristol. In 1900 the State had a population of 2,020,616. This number included 480,430 colored inhabitants, of which 108 were Indians and 480,223

Negroes. Population, 1910, 2,184,789.

HISTORY. The region occupied by Tennessee was first visited by De Soto, but settlements were not made until 1754, though these were destroyed by the Indians. In 1756 the first permanent settlement was founded on the Tennessee River. about thirty miles from Knoxville. Tennessee originally belonged to North Carolina and when that State proposed to surrender the territory to the United States, the settlers protested and organized a government known as the State of This form of government continued from 1785 until 1789, when the region was ceded to the United States, and in the following year the Territory of Tennessee was established. It was admitted as a State in 1796, with the capital at Knoxville, whence it was removed to Nashville in 1802. In 1861 it joined the Southern Confederacy. However, the sentiment as to the war was divided, 31,000 of its citizens joining the Federal and 125,000 the Confederate forces. Many of the severe battles of the Civil War were fought within the boundaries of the State, including those of Murfreesboro, Lookout Mountain, Chickamauga, Island No. 10, and Nashville.

After the close of the war, in 1866, the State

was readmitted to the Union, but much disorder prevailed for some time. In 1869 the Ku-Klux Klan caused some disturbances and several counties were placed under martial law. Subsequently much progress was made in the industrial and commercial developments. Prohibition was made an issue in 1908 and in the same year the Standard Oil Company was prohibited from doing business in the State. The general tendency of legislation has been toward progress in education and industrial enterprises.

TENNESSEE, a river of the United States, which is formed in eastern Tennessee, by the junction of the Holston and Clinch rivers, two streams rising in the southwestern part of Virginia. The course at first is toward the southwest, into northern Alabama, where it makes a bold turn toward the northwest and flows through Tennessee into Kentucky, entering the Ohio River at Paducah, Ky. The Tennessee is navigable for steamers to Florence, 258 miles, where a canal 35 miles long passes the Mussel-Shoal Rapids, whence boats ascend 250 miles farther up the stream. The entire length from the source of the Holston is 1,175 miles, and from the junction of the Holston and Clinch rivers it is 800 miles to its mouth. It receives the Duck, Flint, Big Sandy, and Hiawassee rivers.

TENNESSEE, University of, an educational institution at Knoxville, Tenn., founded as Blount College in 1794. The name was changed to East Tennessee College in 1807, and it was reorganized in 1840 as the East Tennessee University. In 1879 the present name was adopted. Besides the university proper, it comprises the college of agriculture and mechanic arts. The departments in the college include engineering, agriculture, a literary division, and an industrial department for colored students. The university maintains courses in law, engineering, medicine, dentistry, and general academic work. The departments of medicine and dentistry are located at Nashville. A system of university extension work is carried on by means of conventions and institutes. The library has 40,000 volumes and the value of the property is placed at \$800,000. About 2,500 students attend the institution.

TENNIEL (ten'yel), Sir John, painter and illustrator, born in London, England, in 1820. He took an interest in drawing at an early age, and in 1845 won a prize by competing in making a cartoon to be placed in Westminster Hall. Soon after he painted a fresco in the House of Lords. His best productions are cartoons in black and white, and most of these were published in Punch. He illustrated editions of "Through the Looking Glass," "Alice's Adventure in Wonderland," and "Aesop's Fables." His larger productions include "Allegory of Justice," "Saint Cecelia," and "Dropping the Pilot." He was knighted in 1893. He died Feb. 26, 1914.

TENNIS, a game of ball played in a court by two persons, or by four persons divided as partners. The court usually is 96 feet long by 33 wide, inclosed with a wall sufficiently high to prevent the loss of balls by ordinary strokes. The ball is struck with a bat, called a racket, whose striking part is covered with a close, hard network of animal tendon. In tennis the persons strike the ball alternately, with the object of keeping it in motion as long as possible without falling to the ground. The same game is sometimes played without a bat, when the ball is struck with the palm of the hand, and is called hand tennis, or fives. Hand tennis is played to some extent in Great Britain and the United States, but the racket, or racquet, is used more commonly in France and Germany.

TENNYSON (těn'nĭ-sǔn), Alfred, Lord, eminent poet, born at Somersby in Lincolnshire, England, Aug. 6, 1809; died Oct. 6, 1892. He was the third



ALFRED TENNYSON.

was the third son of George Clayton Tennyson, under whom he received his early training, and afterward studied at Cambridge University, where he gained a medal in 1829 for his poem entitled "T i m b u ctoo." While in

college he formed the friendship of Monckton Milnes, Dean Alford, and Arthur Henry Hallam, son of the historian. His brother, Charles Tennyson (1808-1879), joined him in 1827 in publishing "Poems by Two Brothers," and his independent literary career may be said to have begun in 1830, when "Poems, Chiefly Lyrical" appeared. A volume entitled "Poems by Alfred Tennyson," which was published in 1842, won him a place among the leading English poets. The first of his longer poems was issued in 1847 under the title of "Princess: A Medley." He published "In Memoriam" in 1850, in which he immortalized the memory of his friend, Arthur Henry Hallam, who had died shortly previous to that date. He succeeded Wordsworth as poet laureate in November, 1850, received the degree of doctor of laws from the University of Oxford in 1855, and was raised to the peerage in 1874. His many excellent productions justly entitle him to a position among the greatest poets of modern times.

The style of Tennyson is clear. His lines are often exquisitely beautiful, yet their flow is so easy and natural as to give the impression that they fell spontaneously from his pen. All his writings are characterized by an elevation of thought and high moral tone. The language in his verse is among the most faultless of English writings, and his poetry gives the reader a pleas-

ant impression because of the cordial interest the author displays in the life and pursuits of men, as well as in beautiful aspirations and strength of spiritual feeling. Many of his writings have been translated into German, French, and Spanish.

The many masterpieces written by Tennyson place him in the front rank among the writers of the Victorian era. Among his writings that are not mentioned above are "The Charge of the Light Brigade," "Ode on the Death of the Duke of Wellington," "Demeter and Other Poems," "Enoch Arden," "Idylls of the King," "Harold," "Queen Mary," "Akbar's Dream," "Promise of May," "Foresters," "Maude," "The Falcon," "Sixty Years After," "Passing of Arthur," "Holy Grail," "Last Tournament," "Northern Farmer," "Locksley Hall," "Two Voices," "Dream of Fair Women," "Palace of Art," and "Lady of Shalott." "Crossing the Bar" was one of his last poems and was used in the services at his burial at Westminster Abbey. His widow, Lady Tennyson, died Aug. 10, 1896.

TENNYSON, Hallam, author, born at Twickenham, England, Aug. 11, 1852. The eldest son of the poet Alfred Tennyson, he was liberally educated and received an early inclination toward literature. He studied at Marlborough School and at Trinity College, Cambridge, and subsequently pursued a course in law at the Inner Temple. In 1870 he published a translation of "Brunanburh," a song in the old English. This first appeared in the Contemporary Review as a production in prose, and was subsequently turned into verse by his father. A juvenile work entitled "Jack and the Beanstalk" proved popular, and in 1897 he published the authorized biography of his father, entitled "Alfred, Lord Tennyson, a Memoir." In 1899 he was appointed Governor of South Australia, and in 1902 became Governor General of the Australian Commonwealth, but resigned the following year.

He contributed extensively to periodical litera-

TENT, a dwelling made of canvas, felt, or the skins of animals. These materials are usually stretched upon cords or light frames, and are supported by poles set in the ground. Tents are the chief habitations of the nomadic tribes, like those of Arabia, Persia, and Turkestan. The children of Israel lived in tents for forty years while on their journey from Egypt to Palestine. The tents of the Saracens were not known to the nations of Europe until the time of the Crusades, and at that time they found many splendid tent habitations decorated with fine linen and costly furs. Marco Polo found the tents of the Khan of Tartary fitted with the richest skins brought from distant northern countries, such as the ermine of Siberia. The barbarous and wandering tribes of modern times continue to use tents as their chief dependence for shelter.

Tents are used extensively among the civilized nations, especially in military affairs and in exploring campaigns. In warm and dry climates they furnish shelter from the sun and are constructed in the form of an umbrella, with an open space all around for the circulation of the air. Those used in the colder countries are usually made of heavy duck, which is mounted on wooden frames and secured to the ground by pins or pegs. During the winter a double covering is used, the outer of these being an overlapping flap, and in this way they are comfortable even in very cold and damp weather. Tents of large size are employed in giving exhibitions and for Chautauqua purposes. These have a separate canvas for the walls, which are circular in form, and the roof is supported on heavy

poles by means of ropes. TENURE OF OFFICE, the duration or term of an official position, as well as the manner of holding it. Several important acts relating to this subject were passed by the Congress of the United States, though these refer more particularly to those filled by appointment of the President with the consent of the Senate. Prior to 1820 no term of office was provided for any inferior officer, except United States marshals, but in that year a bill was passed providing that a large number of officials are to be appointed for terms of four years. The bill which requires that certain postmasters be appointed by the President for four years and confirmed by the Senate, subject to removal at the pleasure of the President, was passed in 1836. Various offices have since been given the same term. In 1867 the Tenure of Office Act was passed, and was amended in 1869. It provided that no officer subject to confirmation by the Senate should be removed without the consent of that body, except during a recess, when the President might remove such an officer and appoint a successor until the next session of the Senate. This series of legislation paved the way for the so-called spoils system, which resulted in appointment being made from political motives rather than efficiency. A contest between President Cleveland and the Senate caused the law to be repealed in 1887.

TEPIC (tå-pēk'), a city in Mexico, capital of the territory of Tepic, 25 miles east of the port of San Blas. It has railway facilities, a mild and healthful climate, and a growing trade. The place is popular as a summer resort. The manufactures include cotton textiles, cigars, and clothing. It was founded in 1531. Population, 1916, 18,148.

TERCEIRA (ter-sa'é-ra), one of the Azores, the second largest island of the group, about 50 miles northeast of Pico. The area is 163 square miles. It has steep and rocky coasts and the surface is mountainous. Several of the summits are volcanic. Caldeira de Santa Barbara, height 3,500 feet, is the highest summit. Fertile lands are located in many parts of the island and fine pasturage is abundant. The products include wheat, corn, wine, lumber, and live

stock. Angra, on the southeastern coast, is the seat of local government. A large number of the inhabitants were Portuguese. Population, 1916, 49,426.

TERENCE (ter'ens), Publius Terentius Afer, Roman poet, born in Carthage, Africa, in 195; died in 159 B. C. He became the slave of P. Terentius Lucanus, a Roman senator, who gave him the means and opportunity to secure a liberal education and afterward freed him, largely because of his unusual talent. In 168 he published "Andria," his first play, but this was not acted until two years later. The popularity of this play was so great that the author was admitted into the most refined society of Rome, where he became eminent because of his talent and fine address. He received patronage from the younger Scipio and other eminent Romans, but about 161 went to Greece, where he translated 108 comedies written by Menander. Some writers assert that he died in Greece, while others contend that his death resulted from shipwreck while on his return journey to Rome. His works were written in the purest Latin, thus possessing educational value, but only six of his comedies are extant. These include "Eunuch," "Andria," "Adelphi," "Self Tormentor," "Phormio, or the Parasite," and "Hecyra, or the Stepmother." These writings have been widely translated into European languages, especially "Eu-

nuch," which is the most popular. TERHUNE (ter-hūn'), Ma (ter-hūn'), Mary Virginia. best known as Marion Harland, born in Amelia County, Virginia, Dec. 21, 1831. Her father. Samuel P. Hawes, removed from Massachusetts to Virginia, where he conducted a mercantile business. She began to write as a contributor to a weekly paper in Richmond at the early age of fourteen years, and in 1846 published "Marrying Through Prudential Motives." In 1856 she married E. P. Terhune, a minister, and soon after removed to Massachusetts, making her home mainly in Springfield. Many of her writings were contributed to magazines, including Saint Nicholas and Wide Awake. She established a magazine in 1888, called The Home-Maker. Among her published works are "The Hidden Path," "Husbands and Homes," "His Great Self," "Moss-Side," "Christmas Holly," "My Little Love," "Helen Gardner's Wedding Day," "Phemie's Temptation," "Eve's Daughters," "Our Daughters, and What Shall We Do With Them," "Marion Harland's Complete Cook-Book," and "When Grandma Was Fourteen."

TERMITES (ter'mits), or White Ants, a class of insects confined chiefly to the tropics. They resemble in their mode of life the true ants, but belong to a different order. Most species make their nests on the ground, but some build their dwellings among the branches of trees. Those making their nests on the ground construct them in the form of a cone, often 10 to 25 feet high, and these are divided into apartments, such as galleries, magazines, and

chambers. Five classes of termites dwell in a single cone, including the males, females, neuters, soldiers, and workers. Soldiers, neuters, and workers appear to be imperfectly developed females. The males and perfect females have four large wings, but the principal part of the community is made up of workers, which are wingless. Mature males and females swarm into the air shortly after reaching maturity, when they lose their wings and become the so-called kings and queens of future generations.

The queen has a greatly extended abdomen, which contains the eggs, and these it drops promiscuously, to be carried by the workers into the different apartments. Other duties of the work-



TERMITES AND THEIR NESTS.

ers are to build the habitations, construct covered roads, minister to the wants of the young and the king and queen, and stimulate the exit of mature winged insects. The soldiers have a large, square head, with projecting mandibles, and their duty is to defend the community, which they do with singular courage. Termites feed largely on branches of trees and dry wood, which constitute their principal diet, but also on other vegetable forms. They are found in considerable numbers in Western Africa and the warmer regions of America, and in many places their buildings are constructed to form villages of numerous conical dwellings. The male has a painful though harmless bite. Ants and birds

destroy large numbers of termites, and in some places they are prized as human food.

TERN, a genus of gull-like birds which have the bill pointed and somewhat longer than the head. The wings are long, the tail is forked, and the plumage is chiefly white. They are smaller than most gulls, but are almost constantly on the wing, usually flying near the surface of the water in search of fish and other animal forms, upon which they feed. About fifteen species of terns are native to North America, including the royal tern, least tern, and Forester's tern. The royal tern frequents the Atlantic coast of North America. It is twenty inches long and has an alar extent of nearly

fifty inches. Species of terns occur in Europe and Africa. Many of them are birds of passage and in the summer season reach high latitudes, both in the Northern and Southern hemispheres.

TERRACE (ter'ras), the name applied to a level tract of land bordering on a body of water, but elevated some distance above the surface. Terraces are found on the border of many rivers and lakes, and in many places occur near the ocean. They sometimes consist of a series of level tracts that rise above each other with the increase of the distance from the shore. The terraces that border rivers are explained by the action of the water at different periods. At an early date the streams were wider, when the flood plains were cut down, and successive terraces were formed as the channels narrowed and deepened from time to time, hence the older and higher elevations are removed farthest from the stream. Lake terraces may be traced to a shrinkage in the volume of the water, which is evidenced by the fact that they are usually well marked on several sides of the lake basin. Lake Champlain, the Great Lakes, and the sheets of water in the Great Basin have terraces due to this cause. These tracts are usually fertile and suitable for cultivation, though there are exceptions in the arid and desert regions.

TERRA COTTA (ter'ra kot'ta), an Italian term meaning baked clay. It is commonly applied to a species of hard pottery much used in statuary, vases, and building ornamentation. Terra cotta was employed by the ancients in the construction of figures and architectural ornamentations, and many well-preserved and artistically beautiful specimens of works in terra cotta have been recovered from the sites of ancient cities. Some of the finest specimens belong to the period of Greek art, probably about 450 B. C., and others to even earlier periods. Fine productions were not limited to Greece, but beautiful specimens have been exhumed from the cities of ancient Phoenicia, Babylonia, Assyria, and Rome.

In the 15th century terra cotta was adapted in many parts of Europe to the most artistic and elaborate architectural purposes, as is still evidenced by the fine churches of Saint Catharine, in Brandenburg; Saint Stephen, in Tanger Munde; and Saint Maria, in Milan. It continued a popular material until the 18th century, when it became more uncommon, but its use has been revived to a large extent within the past 25 years. Fine powdered silica and potter's clay constitute the principal ingredients of terra cotta as made as present. Many beautiful color effects are obtained, the most pleasing being a cream color and a rich red. It is possible to enamel or glaze in white and colors, this work being done in a manner similar to tile glazing.

TERRA DEL FUEGO. See Tierra del

Fuego.

TERRAPIN (těr'rà-pĭn). See Tortoise. TERRE HAUTE (těr're hōt), a city in Indiana, county seat of Vigo County, on the Wabash River, 72 miles southwest of Indianapolis. Communication is furnished by the Terre Haute and Indianapolis, the Evansville and Terre Haute, the Cleveland, Cincinnati, Chicago and Saint Louis, and other railroads. It is surrounded by a fertile agricultural and mining country. The city has an attractive appearance, being located on an elevated plateau, and has broad and beautifully improved streets. Among the principal buildings are the county courthouse, the State normal school, the Providence Hospital, the Rose Polytechnic Institute, the Coates College, and the Saint Mary's Seminary. Other features include the Federal customhouse,

Terre Haute has a large trade in coal, grain, live stock, and merchandise. Among the manufactures are nails, flour, hardware, machinery, farming implements, packed meat, railway cars, and clothing. The streets are well lighted by gas and electric lights and beautified by avenues of trees. It has water and sewerage systems, an extensive line of street railways, and brick, asphalt, and macadam pavements. A bridge across the Wabash River gives the city connection with the west side. Terre Haute was settled in 1816 and chartered as a city in 1833. Population, 1900, 36,673; in 1910, 58,157.

the public library, and Deming and Collett parks.

TERRELL (ter'rel), a city of Texas, in Kaufman County, 30 miles east of Dallas, on the Texas Midland and the Texas and Pacific railroads. The surrounding country is fertile, producing cereals, cotton, and fruits. It is important as a market for live stock, farm produce, and merchandise. Among the manufactures are flour, leather, clothing, machinery, cotton and woolen goods, cigars, and earthenware. Electric lighting, sewerage, and several fine school and church buildings are among the general improvements. It is the seat of the North Texas Hospital for the Insane. The place was so named from Robert Terrell, who settled here in 1872. Population, 1900, 6,330.

TERRIER (ter'ri-er), the name of a species of the domestic dog, so called from its courage in attacking small animals both above and under the ground. It pursues rats, badgers, cats, and foxes by digging into the earth. The Scotch terrier is a well-known breed and is distinguished by its dark eyes, prick ears, and rough-coated body. It is either black, reddish brown, or red and black, and weighs from fif-teen to twenty pounds. The bull terrier is a breed crossed with the bulldog and is especially noted for its infinite courage. A large dog with straight hair of a black-and-tanned color is known as the Welsh terrier, and a yellow species with wire-hair is called the Irish terrier. The skye terrier, a species of the Scotch terrier, is prized for its long, silky coats. Several breeds of these dogs are called fox terrier and are distinguished by their gay and lively disposition, black and tapering nose, and fox-shaped ears. Other breeds include the Boston terrier and the Clydesdale, the Yorkshire, and the Maltese

TERRITORY (těr'rĭ-tô-rỹ), the term applied in various countries to certain portions of the public lands that are under the direct control of the national legislature, which have not been organized into a state or a province. The territorial form of government is usually maintained until the territory has developed sufficiently in wealth and population to entitle it to admission into the federation or union of states or provinces. In the United States the term is applied to any tract under the Federal government, and, after attaining sufficient population, it may adopt a constitution and be admitted into the Union on the approval of Congress. The term is used in a similar way in Canada and the republics of South America. Australia has one Territory, known as the Northern Territory, which is governed by the State of South Australia.

TERROR, Reign of. See French Revolu-

TERRY (těr'rĭ), Alfred Howe, military leader, born in Hartford, Conn., Nov. 10, 1827; died in New Haven, Dec. 16, 1890. He pursued a course of law at Yale University and in 1849 was admitted to the bar. From 1854 to 1860 he served as clerk of the superior and supreme courts of Connecticut, and within that period went to Europe to study the military defenses in the Crimea. He entered the United States military service at the beginning of the Civil War. was made brigadier general of volunteers in 1862, and took a prominent part in capturing Fort Wagner. In 1865 he commanded jointly with Admiral Porter in the attack on Fort Fisher, which was captured on Jan. 14 of that year, and for efficient services was made brigadier general and received the thanks of Congress. He became major general in the regular army on March 13, 1865, and subsequently commanded the departments of Dakota and the South. In 1876 he had charge of an expedition against the Sioux Indians under Sitting Bull, whom he drove into Canada. In 1886 he succeeded General Hancock as full major general, and two years later voluntarily retired from the army

TERRY, Ellen Alicia, actress, born in Coventry, England, Feb. 27, 1848. She was trained for the stage from early childhood, appearing in



ELLEN TERRY.

different rôles when only eight years old, but regularly entered upon the stage in 1858, when she took the parts of Prince Arthur in "King John" and Mamillius in "Winter's Tale." In 1863 she played in London as Gertrude in "The Little Treas-ure," Hero in "Much

ing," and Mary Meredith in "Our American Cousin." She married Charles Kelley in 1864 and left the stage, but again appeared as a regular performer at the New Queen's Theater, London, in 1867. In the meantime she married Mr. Wardell, hence is known in private life as Mrs. E. A. Wardell. Later she played at the Prince of Wales Theater, where she took the part of Portia, and in 1878 appeared for the first time at the Lyceum, playing with much success in "Much Ado About Nothing," "Hamlet," "Romeo and Juliet," and "The Merchant of Venice." Later she played as Henrietta Maria in "Charles I.," Viola in "Twelfth Night," and Camma in Tennyson's tragedy of "The Cup." She accompanied Henry Irving on several successful tours in America and visited Germany and other European countries. Among her most successful rôles in the later period of her stage life are those of Queen Catharine in "Henry VIII.," Lucy Ashton in "Ravenswood," Rosamonde in "Becket," Marguerite in "Faust," and the Heroine in "Dead Heart."

TERTIARY PERIOD (ter'shi-a-ry), or Cenozoic Era, the division of geologic time that preceded the Quaternary era and followed the Mesozoic era. Geologists divide the rock system of this division into five periods, and sometimes they use the term Cenozoic to embrace both the Tertiary and the Mesozoic. During the Tertiary period violent changes took place on the exterior of the earth. The surface was largely above the sea, and within that time large portions of the Rocky Mountains, the Andes, and the Himalayas were formed. Owing to the surface of the earth being elevated in many localities, the age of ice, known as the Glacial period, took place in the temperate zones. Within the period many changes were wrought in the animals, both upon land and in the sea. Prior to this time great reptiles were common, and they were succeeded by gigantic mammals. See Geology.

TERTULLIAN (ter-tul'li-an), Quintus Septimus Florens, Latin writer, born at Carthage, in Africa, about 160; died about 230 A.D. He was the son of a Roman centurion and at an early age embraced the Christian religion. For some time he preached at Carthage, and later at Rome. He is known for his controversy with others who were less rigid in their ethical views. In 202 he joined the Montanists, who were particularly rigid in morals and looked upon earthly pleasures with contempt. His most noted work is an address to the Roman magistrates in defense of Christianity, entitled "The Apology." By his writing and preaching he well deserves a place among the early Latin fathers of the Church. Among his books are "On the Dress of Women," "On the Proscription of Heretics," "On the Resurrection of the Body," "On the Flesh of Christ," and "Against the Gentiles.

TESLA (tes'la), Nikola, electrician and inventor, born at Smiljan, Croatia, Austria-Hungary, in 1857. After studying in the schools of his native country, he pursued a course in engineering at the École Polytechnique, Paris, and later became engineer of the Paris Edison station. He was employed for some time at the Edison Laboratory, near Orange, N. J., but later opened an establishment of his own to conduct research. Tesla takes high rank among the most eminent electricians and has made many valuable additions to the fund of knowledge in electrical science. He invented the rotary field motor in 1888, the multiphase system which was adapted to the 50,000 horse power plant that transmits the water power of Niagara Falls to Buffalo and other cities. He discovered that motors and electric lamps can be operated on one wire without a circuit. In 1899 he built a laboratory about ten miles from Pike's Peak, Colorado, where he conducted extensive research and soon after announced that he had discovered how to confine electrical currents of a pressure of 50,000,000 volts and how to produce electrical movements up to 110,000 horse power. He published an opinion that his instruments had been affected at different times by feeble electrical disturbances not of solar or terrestrial origin, and expressed the view that these disturbances were probably from the planet Mars, produced by instruments perfected and operated by inhabitants of that heavenly body. Whether or not this be true may only be conjectured, but it is certain that Tesla devised instruments of much power and remarkable perfection.

TEST OATH, the oath required under various acts of the Parliament of England, administered in connection with certain religious tests imposed upon persons who held public office. The first legislation of this kind was passed in the 17th century, and subsequent acts to secure

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the establishment of the Protestant faith were enacted at different times. Most important of these were the Corporation Act of 1661 and the Test Act of 1673. The former provided that all magistrates were to receive the communion according to the Church of England, after taking the oaths of allegiance and supremacy. This test was further strengthened by the law of 1673, which made it obligatory upon those who passed the ordeal to renounce the doctrine that arms may be taken up against the king. After making numerous modifications, the statutes

were repealed in 1828. A form of test by oaths was imposed in the United States after the Civil War, both by State and Federal legislation, but it was held to be unconstitutional.

TETANUS (těťa-nus), or Lockjaw, a disease characterized by painful and protracted contraction of a number of voluntary muscles. It is spasmodic in character and attacks sometimes succeed each other at intervals for several days or even weeks. Sometimes the muscular contraction is so intense that the lower jaw is held firmly against the upper jaw, frequently so strongly that they cannot be separated. The chief causes are injuries, intestinal worms, excessive wet and cold, and the presence of a bacterium in a wound. It affects both man and animals and violent cases are frequently fatal.

Horses and sheep are more liable to it than

other domestic animals.

TETZEL (těťsel), Johann, noted monk, born in Leipsic, Germany, about 1460; died in August, 1519. He descended from a Catholic family, studied theology in Leipsic, and became a Dominican monk in 1489. His ability as a pulpit orator caused the church authorities to engage him to preach in favor of indulgences with the view of raising money for religious purposes. He was appointed as inquisitor in 1516, when he published a design to grant indulgences with a view of raising money to aid in constructing the Church of Saint Peter at Rome. His designs were opposed by Martin Luther, who posted 95 theses on the door of the church at Wittenberg, in which he pointed out the inconsistency in the practice of selling indulgences. These were burned by Tetzel at Jüterbogk, in 1518, and the students of Wittenberg soon after publicly burned 800 tracts written by Tetzel in favor of the practice. Many biographers have written lives of Tetzel, many of which disagree as to his designs and the view he held regarding the forgiveness of sins committed by those purchasing indulgences.

TEUTONIC KNIGHTS (tû-tŏn'īk nītz), a powerful military and religious order which originated at the time of the Crusades. It was founded by citizens of Bremen and Lübeck for the purpose of aiding the soldiers who suffered during the siege of Acre, in 1190, and Frederick Barbarossa of Germany raised it to an order of knighthood. The grand master first dwelt at Jerusalem, but when Palestine fell into the hands of the Turks

he removed to Venice, and later the headquarters were established in Germany. During the 15th century the order became very powerful and many eminent men of Europe, including Henry IV. of England, fought under its banner. It continued until 1809, when it was dissolved by Napoleon. The order was revived by the Emperor of Austria, in 1840, and it now has a large membership in that country.

TEUTONS (tū'tonz), a tribe of Germans which inhabited the regions near the Baltic Sea, east of the Elbe. In 103 B. c. the Teutons joined the Cimbri to invade Gaul, where they successively destroyed three Roman armies. Soon after they proceeded to invade Italy, but were defeated with great loss by Marius in 102 B. C., in the region occupied by the French department of Vouches de Rhone. The name Teuton was ultimately applied to the Germanic people of Europe and is now used to denote Germans, Dutch, Scandinavians, and those of Anglo-Saxon descent, as opposed to the Celts. Teutonic languages belong to the Aryan family and include three groups: the Low German, High German, and Scandinavian. The Low German dialects include the Gothic, Friesian, Flemish, Dutch, and English tongues; the High German tongues embrace the Old High German of the 7th to the 11th century, the Middle High German of the 12th to the 15th century, and the Modern High German; and the Scandinavian

languages include the Swedish, Icelandic, Nor-

wegian, and Danish tongues.

TEXARKANA (těks-är-kăn'à), a city on the boundary line of Arkansas and Texas, being the county seat of Miller County, Arkansas, and situated partly in Bowie County, Texas. It is on the Saint Louis, Iron Mountain and Southern, the Kansas City Southern, the Texas Pacific, and other railroads. The surrounding country is a fertile agricultural region. noteworthy buildings include the county courthouse, the post office, the Saint Agnes Academy, the Y. M. C. A. building, the Texarkana Industrial College, and many schools and churches. Among the manufactures are cotton goods, cotton-seed oil, railroad cars, ice, tobacco products, machinery, and farming implements. It has systems of waterworks, sanitary sewerage, and public lighting. The trade is large in produce, lumber, cotton, and merchandise. A settlement was made in the vicinity in 1873 and both towns were chartered as cities in 1887. census of 1910 credits a population of 5,655 to the portion in Arkansas and 9,790 to the part in Texas; total, 15,445.

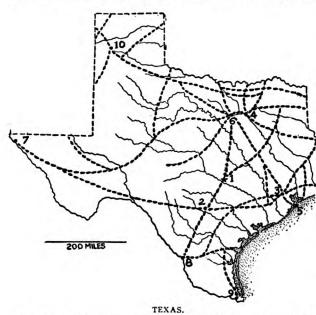
TEXAS (těks'as), a southwestern State of the United States, the largest in the Union, popularly called the Lone Star State. It is bounded on the north by New Mexico, Oklahoma, and Arkansas; east by Arkansas, Louisiana, and the Gulf of Mexico; south by the Gulf of Mexico and Mexico; and west by Mexico and New Mexico. The greatest length from east to west

TEXAS

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is about 875 miles and the greatest width is 745 miles. It is in the form of an irregular triangle, the apex extending south, and a square known as the Pan Handle lying toward the The area is 265,780 square miles, of which 3,490 square miles are water surface.

DESCRIPTION. The coast line has a length of 372 miles along the Gulf of Mexico, being in the form of a crescent, and the shores are indented by numerous bays. Among the inlets are Sabine Pass and the bays of Galveston, Matagorda, San Antonio, and Corpus Christi. A number of islands of more or less importance lie near the shore, including Galveston, Matagorda, Mustang, Padre, and Saint Joseph. Padre Island is a nar-



1, Austin; 2, San Antonio; 3, Houston; 4, Dallas; 5, Galveston; 6, Fort ly with location in latitude and is Worth; 7, El Paso; 8, Laredo; 9, Brownsville; 10, Amarillo. Chief railroads noticeably affected by differences in shown by dotted lines.

row stretch of land extending from near the mouth of the Rio Grande toward the north, having a length of about 100 miles and forming the extremely salty Bay of Laguna de Madre. Farther north the lagoons extend inland as irregular bays and estuaries and are lined by marshy shores or high bluffs.

Texas has an exceedingly varied surface, the coast region being low and marshy, whence the surface rises gradually toward the northwest. A belt known as the Black Prairie extends along the Gulf. This region is about 100 miles wide in the north and south, but it is somewhat narrower in the central part. Near the Gulf the elevation is not only a few feet above the level of the water, but it rises gradually toward the inland, attaining a height of about 500 feet at a distance of 150 miles inland. This section is very level, but it merges into a gently undulating plain. In the eastern part it is covered by exten-

sive forests, and toward the northwest is the Grand Prairie, a plateau of great fertility. The Staked Plains, or Llano Estacado, a region quite arid and treeless, occupies the western part. Between the Pecos and the Rio Grande are the Guadalupe, Eagle, and other mountains. In this region the general elevation ranges from 3,000 to 9,000 feet above the sea. Among the principal summits are Eagle Mountain, 7,000 feet, and Guadalupe Peak, 9,000 feet. The general altitude of the Staked Plains and the Pan Handle ranges from 2,700 to 4,000 feet. Most of the State has an undulating surface and a fertile soil, but denuded and sandy tracts lie in the western part, where deep canyons have been cut

into the plains by excessive rains in

former periods.

The drainage is exclusively into the Gulf of Mexico, and the rivers have a general course toward the southeast. All of the boundary with Mexico is formed by the Rio Grande, which receives the inflow of the Pecos, its largest tributary. These rivers and the Canadian, which flows through the northern part, rise in the Rocky Mountains. All the other streams rise within the State, including the Red River, which forms the greater part of the boundary with Oklahoma, while a part of the Louisiana border is formed by the Sabine River. Among the principal rivers within the State are the Neches, Trinity, Brazos, Colorado, Guadalupe, San Antonio, and Nueces. These streams flow chiefly into inlets from the Gulf, and a number are navigable during high water for considerable distances, but bars somewhat obstruct their mouths.

CLIMATE. The climate varies greataltitude. As a whole the climate

is drier than that of the other Gulf States. In January the mean temperature at Galveston is 45° and at Amarillo it is 40°, and the corresponding figures for July are 84° at Galveston and 76° at Amarillo. The freezing point is very seldom reached on the coast, but in the northwest the temperature sometimes falls as low as zero. On the coast the maximum heat ranges from 90° to 95° and in the western highlands it approximates 100°. Rainfall is abundant in the coast region and the central part, where it ranges from 30 to 50 inches, but in the western part it is scant, being about 10 inches at El Paso and 22 inches at Amarillo.

MINING. Texas has extensive and varied products of minerals. Large fields of lignite and bituminous coal are found, and the annual output now proximates about 2,250,000 tons. Phosphate rock is obtained in large quantities. Extensive fields of petroleum and natural gas

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occur in the valley of the Sabine and in the vicinity of Beaumont. Copper, pig iron, and gypsum are obtained in large quantities. Cinnabar is found in deposits along the Rio Grande and in the southwestern part of the State, and extensive beds of salt, granite, limestone, and sandstone are worked. Clays suitable for brick and pottery are abundant. Other minerals include silver, mineral waters, and asphalt.

AGRICULTURE. Texas is one of the chief agricultural states of the Union, having a favorable climate and a large area of productive land. About 75 per cent, of the total surface is included in ranches and farms, which average 357 acres. In the aggregate value of farm products the State takes fifth rank, but crop raising is confined chiefly to the central and eastern parts, though large areas in the northwestern section have been improved for farming within the last few years. Corn and cotton are raised on larger areas than all other crops combined, and the acreage of each approximates about 6,650,000 acres. Wheat takes rank as the third crop in acreage, but it is closely followed by hay and oats. Other important crops include dry peas, sweet potatoes, Kaffir corn, sorghum and sugar cane, potatoes, peanuts, tobacco, and rice. Large areas of the lowlands along the coasts are devoted to the culture of rice and sugar cane. Kaffir corn, millet, oats, and wheat are important crops in the northwest. The most valuable lands lie immediately between the coastal region and the drier belt of the west and northwest. Fruits of all kinds are grown with profit, and some sections are especially valuable for raising oranges, lemons, bananas, vegetables, and small fruits.

While dairving is an important industry, cattle raising is chiefly for meat. Live stock is grown profitably in all parts of the State, but receives special attention in the great grazing region of the western section. In the number of beef cattle the State holds first rank. It has correspondingly large interests in rearing horses, sheep, swine, and poultry. Texas takes first rank in the number of horses and cattle, second in swine,

and fourth in sheep.

Manufactures. The State has vast quantities of materials to stimulate manufactures of all kinds. An abundance of timber in the east, such as oak, cedar, pecan, cypress, hickory, and pine, furnishes much for construction and manufacturing purposes. Many species of cacti thrive in the Rio Grande valley, some of which attain the size and height of trees and yield material for fuel. Flour and grist, coke, lumber products, and foundry and machine-shop products are among the leading manufactures, and these are made entirely from materials produced in the State. Cotton and cotton-seed products, tanned and finished leather, and spirituous liquors are produced in large quantity. The State has a large output of cigars, plug and smoking tobacco, saddlery, clay products, cured meat and

fish, railway cars, steam engines, and canned fruits and vegetables.

COMMERCE AND TRANSPORTATION. The domestic and foreign trade is extensive. Local shipments are carried by steamboats along the coast and inland by numerous railways. Wool, live stock, cotton, lumber, fruits, vegetables, and tobacco products are exported. Galveston, Corpus Christi, Brazos de Santiago, Saluria, and Paso del Norte are the chief ports. Galveston takes rank as the second largest port on the Gulf.

The lines of railways have a length of 15,500 miles. The west central part is partly without railroad facilities, but all other sections are supplied with numerous trunk and branch lines. Among the principal railroads are the Texas Pacific, the Kansas City Southern, the Southern Pacific, the Chicago, Rock Island and Pacific, the Missouri, Kansas and Texas, the Saint Louis and Southwestern, the Atchison, Topeka and Santa Fé, the International and Great Northern, and a number of others. Electric lines are operated in the larger cities and many interurban and rural districts. Much has been done to improve the highways by grading and the construction of bridges.

GOVERNMENT. The present constitution was adopted in 1875. It vests the chief authority in the governor, lieutenant governor, comptroller, treasurer, attorney-general, commissioner of the general land office, and superintendent of public instruction, all elected for two years. railroad commissioners are elected for three years. Several State officials are appointed by the Governor, including the adjutant general, the secretary of State, and a number of others. The supreme court consists of a chief justice

and two assistant justices, each elected for six years. In addition there are a court of criminal appeals, five courts of civil appeals, district courts, county courts, and justices of the peace. Local government is administered by the counties, municipalities, and townships,

EDUCATION. Based upon the total population, the rate of illiteracy is 14.3 per cent., but among whites it is 6.1 and among blacks it is 36 per cent. A large State endowment is available for the support of the public schools, which, together with local school taxes, places the educational work on a very satisfactory basis. Elementary schools are maintained in the rural districts, while the towns and cities have wellorganized secondary and high schools. progress has been made in establishing kindergarten and manual training work in the larger The general supervision of the schools is cities. vested in the State superintendent of public instruction, who is aided by a board of education. and separate schools are maintained for white and colored children. Normal schools for whites are maintained by the State at Huntsville, San Marcos, and Denton. At Prairie View, near Hempstead, is a normal school for Negroes. Summer schools are supported for training

teachers. These institutions are in session a term of about four weeks and have an attendance of more than 6,000.

The University of Texas, located at Austin, is at the head of public instruction. Bryan has the Agricultural and Medical College and Galveston has the medical branch of the University of Texas. Many private schools and institutions of higher learning are in a flourishing condition. These include the Polytechnic College, Fort Worth; the Texas Christian University, Hermosa; the Evangelical Lutheran College, Brenham; the Southwestern University, Georgetown; the Baylor University, Waco; the Henry College, Campbell; the Fort Worth University, Fort Worth; the Saint Edward's College, Austin; and the Trinity University, Waxahachie. Austin, Terrell, and San Antonio have asylums for the insane; Austin has a school for the deaf and dumb; and institutions for the blind, both for white and colored youth, are maintained at Austin. Corsicana has an orphans' home and Austin has the Confederate Soldiers' Home. Penitentiaries are located at Huntsville and Rusk, and a reformatory for penal offenders is situated at Gatesville.

INHABITANTS. The average density is about twelve persons to the square mile. It has a larger immigration than any other State in the South, and the foreign-born inhabitants number 179,357. The Baptist denomination has the largest membership. Other religious bodies strongly represented include the Methodists, Christians, Presbyterians, Roman Catholics, Episcopalians, and Lutherans. Austin, on the Colorado River, is the capital. Other cities of importance include San Antonio, Houston, Dallas, Galveston, Fort Worth, Waco, El Paso, Laredo, Denison, Sherman, Marshall, Taylor, Gainesville, Corsicana, Brownsville, Palestine, Brenham, Corpus Christi, and Greenville. In 1900 it had a population of 3,048,710, hence takes rank as the most populous State in the South. This number included a colored population of 622,041, of which 470 were Indians, 836 Chinese, and 620,722 Negroes. Population, 1910, 3,896,542.

HISTORY. Texas was originally a part of the Spanish possessions in America. It was explored by Cabeza de Vaca in 1528 and first settled by La Salle in 1685, on the Lobaca River, where Fort Saint Louis was founded. Many severe and extended contests with the Indians occurred to interfere with rapid development. In 1820 the eastern boundary of Texas was settled in a treaty with Spain and at the same time American colonists were invited to make settlements within the region. Representatives of 20,000 settlers met at a State convention in 1833 and adopted a constitution, but Santa Anna, President of Mexico, refused to recognize it as a State, preferring to establish several departments. He accordingly invaded Texas with a large army, but was defeated by General Houston, in 1836, in the Battle of San Jacinto. The

people had already declared the independence of Texas and, after adopting a constitution, elected General Houston president. The new government was recognized as independent by the United States, Belgium, France, and England in 1837, but a large majority of the people favored annexation to the United States. Both houses of Congress passed a joint resolution annexing Texas on Dec. 29, 1845.

The policy of the United States and the dispute over the western boundary of Texas caused the Mexican War, which terminated with the Treaty of Guadalupe Hidalgo. In 1850 all the previously Mexican territory lying outside the present limits of the State was ceded to the United States in consideration of the payment of \$10,000,000. An ordinance of secession was passed Feb. 1, 1861, but Texas was restored to the Union on March 30, 1870. The Federal policy of reconstruction caused the State to become in debt to the extent of several million dollars. However, the growth in wealth and population since the war has been phenomenal, and there are yet many opportunities for young men to find fields for the development of lucrative industrial enterprises.

TEXAS, University of, an educational institution at Austin, Tex., founded by an act of the Legislature in 1876. It was open for instruction in 1883, when it received an additional grant of land from the State. It embraces the departments of literature and science, civil engineering and mining, law, electricity and mechanical engineering, and medicine, the last mentioned being located at Galveston. The university conducts a line of summer school work. It has a library of 90,000 volumes and endowments of \$1,500,000. The attendance averages 3,450 students.

THACKERAY (thăk'ếr-ĭ), William Makepeace, novelist and humorist, born in Calcutta, India, July 18, 1811; died Dec. 24, 1863. He was

a son of Richard Thackeray, who served for many years as a civil officer in the employ of the East India Company. His education was obtained at London Charterhouse School and Cambridge University, but he left the latter before graduating Subsequently he studied at Weimar,



WILLIAM M. THACKERAY.

Germany, where he formed the acquaintance of Goethe. He had fallen heir to a large fortune at the death of his father, but this he soon spent by traveling and personal liberality. It was his original intention to become an artist, for which purpose he visited Italy and France, but he soon became convinced that literature would more nearly suit his taste and ability.

His first writings were in the form of contributions to Fraser's Magazine, under the names of George Fitz-Boodle and Michael Angelo Titmarsh. These writings consisted of poetry, tales, and criticisms, which he illustrated by his own pencil. In 1840 he published "The Paris Sketch Book," and the following year contributed "The Snob Papers" to Punch. "Vanity Fair," published in monthly parts from 1846 to 1848, gave him first rank among the novelists of England. His series of lectures on "English Humorists of the Eighteenth Century" was delivered in England and Scotland, in 1851, and was soon after published in America.

In the period from 1852 to 1855 he planned and wrote his "Newcomes," which is the most popular of his novels. It presents as a leading theme the misery occasioned by ill-sorted marriages. He became editor of the Cornhill Magazine in 1859, to which he contributed his "Roundabout Papers," but severed his connection with that periodical in 1862. Thackeray had the true poetic instinct, his works taking high rank in versification, humor, and grace. He is regarded by many as one of the leading, if not the leading, English novelists, critics, and essayists in the reign of Queen Victoria. He was buried in Kensal Green, and a fine bust was placed to his memory in Westminster Abbey. Among the writings not already mentioned are "Great Hoggarty Diamond," "Barry Lyndon," "Yellowplush Papers," "Second Funeral of Napoleon," "Irish Sketch Book," "History of Pendennis," "Vir-ginians," "Denis Duval," "Esmond," and "Lovel the Widower." He lectured for some years on "The Four Georges."

THALBERG (täl'berg), Sigismond, musician, born at Geneva, Switzerland, Jan. 7, 1812; died Aug. 26, 1871. He was a son of Prince Moritz Dietrichstein, who provided for his musical education at Vienna. In 1830 he began to appear in public, and four years later was made chamber virtuoso at the court of Austria. He appeared in Paris as the rival of Liszt, and subsequently won applause in many countries of Europe and in the United States. In 1862 he made a tour of Brazil and other countries of South America. As a musician and singer he took high rank, and is the author of numerous

compositions for the piano.

THALER (tä'ler), a monetary coin first made in Bohemia in 1519, where it was known as Joachimsthaler. It was so named from Joachimsthal, the town in which it was first made. This coin was the unit of value in Germany until 1873, when it was superseded by the mark. A small quantity of these coins are still in circulation, valued at about seventy-one cents, or three marks

THALES (thā'lēz), eminent Greek philosopher, born in Miletus, Asia Minor, about 640; died in 548 B. C. Little is known of his life, but he is classed as one of the seven wise men and is regarded the founder of Greek astronomy, geometry, and philosophy. He was of noble birth and it is thought that he received instruction in geometry and other branches from the priests of Egypt, where he evidently spent a number of years. After returning to Greece, his reputation for wisdom and learning spread with remarkable rapidity, but his renown was extended subsequent to his death because he had predicted an eclipse of the sun which took place on May 28, 525 B.C. He taught his doctrines orally to his disciples instead of committing them to writing, and it is only from the later writers of Greece, such as Herodotus and Aristotle, that we are privileged to know anything regarding him.

THALIA (thà-lī'à), in Greek mythology, one of the nine Muses. She presided over comedy and idyllic poetry. In statuary she is represented with the comic mask, a wreath of ivy,

and the shepherd's staff.

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THALLIUM (thăl'li-um), a soft, white, crystalline metal occurring in small quantities, used in alloys and glassmaking. It is slightly heavier but softer than lead. Thallium has a specific gravity of 11.9, its salts are exceedingly poisonous, and it imparts a green color to a flame. Crookes discovered this metal in 1861 by the use of the spectrum, while inspecting deposits accumulated in a sulphuric acid factory. Small quantities of thallium occur in iron pyrites. and it is obtained from the dust which collects in the flues of sulphuric acid works when these pyrites are burned for the production of sulphur dioxide. It is found in native sulphur and with copper. The salts of thallium are poisonous. copper.

THAMES (temz), a river in England, which rises in the Cotswold Hills and, after a course of 222 miles toward the east, flows into the North Sea. The basin has an extent of 5,425 square miles. In the greater part of its course it forms the boundary line between a number of the counties of southern England. Large vessels ascend to London, 60 miles from its mouth. It is of vast commercial importance because of numerous canals that connect it with trade and manufacturing centers. Many bridges cross it at London, where extensive embankments and dock improvements are maintained. The tide is perceptible seventy miles up the river from its mouth, which is eighteen miles wide. Among the principal cities on the Thames are London, Gravesend, Greenwich, Windsor, Eton, Henley, Reading, and Oxford. Its tributaries include the Kennet, Mole, Darent, Medway, and Roding.

THAMES, Battle of the, an engagement of the War of 1812, fought at the Moravian settlement on the Thames River, in the Province of Ontario. It occurred on Oct. 5, 1813, when the Americans under General Harrison made an attack upon the British under General Proctor. The latter was aided by a force of Indians under Tecumseh, who was slain, and the British were defeated. Col. Richard M. Johnson led a famous cavalry charge against the British and it is

claimed that he personally slew Tecumseh. The result of the battle was that the British lost all the advantages gained by Hull at Detroit and the confederation of Indians was broken.

THANE, the name of an ancient rank among the Anglo-Saxons, although it was first applied to the followers of kings and chieftains. Ultimately there were two classes of thanes, one known simply as thanes, and the other as king's thanes. It was possible for all to attain to the rank, which was bestowed either as a reward for valued services to the state or in recognition of those who possessed considerable property of value. The titles of thane and baron were used interchangeably after the Norman conquest, and, according to some writers, the thanes were subsequently called barons. It is probable that the inferior thanes were later termed knights and that the title of baron was extended only to the superior thanes.

THANET (thăn'ēt), Isle of, an island of England, on the northern coast of Kent, separated from the mainland by the Stour River and its branches. It is about five miles wide and ten miles long. The area is 41 square miles. The surface is level and fertile and it has some interests in agriculture and stock raising. Ramsgate, Broadstairs, Westgate, and Margate are famous as watering places. Population, 1906,

68,450.

THANKSGIVING DAY, a festival of thanksgiving, set apart to return thanks for the harvest and mercies of the closing year, which resembles the feast of ingathering held by the Hebrews. The Pilgrim Fathers at Plymouth, in 1621, kept the earliest harvest thanksgiving in America, and in the succeeding centuries the practice was frequently repeated. In many of the colonies the governors appointed a day for rejoicing in the autumn, especially in the New England States, where thanksgiving services have been popular from the early settlements and where Thanksgiving Day still ranks as the spe-cial annual festival. Thanksgiving services were recommended by Congress for each year of the Revolutionary War, and in 1784 a special day of thanksgiving was appointed for the return of peace. After the adoption of the Constitution, in 1789, Washington appointed a thanksgiving day, while a special thanksgiving for the welfare of the nation was given in 1795, and another for the return of peace was appointed by Madison in 1815. The festival has been observed annually in New York since 1817, but its general observance in the United States dates from 1863, when Lincoln issued a proclamation recommending that the last Thursday of November be observed as Thanksgiving Day. All the succeeding presidents have regularly issued proclamations calling the attention of the nation to the observance of this festival, which ranks as a legal holiday, and the duty of observing it in a fitting manner is likewise proclaimed by the various governors, in whom alone is vested the legal authority to declare a holiday within the states.

THASOS (thä'sôs), an island in the Aegean Sea, off the coast of Macedonia. It has an area of 85 square miles. The surface is mountainous and quite barren and near the center of the island is Mount Hypsarion, height 3,428 feet. Lumber, honey, olive oil, gold, and wine are the chief products. The island was colonized by the Phoenicians at an early date and was captured by Darius in 492 B.C. It was subject to Athens for many years and later to the Romans. The Turks captured it in 1462, since which time it has been a possession of Turkey. Population, 12,150.

THAYER (thâr), Sylvanus, soldier and military engineer, born in Braintree, Mass., June 9, 1785; died there Sept. 7, 1872. In 1807 he graduated from Dartmouth College and the following year from the United States Military Academy. Shortly after he was assigned for duty to the engineer corps. After serving as engineer and instructor in mathematics at the academy for four years, he was promoted first lieutenant for gallantry in the War of 1812. He served under Gen. Wade Hampton on Lake Champlain in 1813, and the following year went to Europe to examine military works and study the operations of the allied armies at Paris. In 1817 he became superintendent of the United States Military Academy at West Point, where he rendered valuable services and placed that institution in its present efficient condition. He retired from teaching at West Point in 1833 and spent the succeeding thirty years in constructing defenses at Boston harbor. In 1863 he withdrew from active service with the rank of brigadier general. Thayer is the author of a number of valuable papers on engineering and donated liberally toward the extension of education. Among his gifts are \$10,000 to the public library at Braintree, \$300,000 to an academy at Braintree, and \$70,000 to the Thayer School of Civil Engineering at Dartmouth. A monument to his memory is situated at West Point, on which is the inscription, "Colonel Thayer, Father of the United States Military Academy.

THEATER (the a-ter), a building especially adapted to the representation of dramatic, operatic, or spectacular performances. The theater had its beginning in Greece, where the first drama was presented in a movable vehicle about 750 years before the Christian era. Later wooden scaffolds were constructed in public places on which to give performances, but the occurrence of an accident in 500 B. C. suggested the construction of a permanent building capable of accommodating large numbers. Plans for the first noted theater were soon after completed, but the building itself was not finished until 340 B. C. In the meantime many theaters on the same model were erected in Greece and Asia Minor.

The great stone theater of Dionysus at Athens was built in an inclosure sacred to Dionysus,

its auditorium being hewn in the solid rock at the southeast side of the Acropolis. All the celebrated Grecian theaters were similarly constructed, a fact evidenced by the ruins of ancient cities, but the Romans began to build them on level sites in the 1st century B. c. Some of these theaters surpassed in magnitude the finest temples, many having a capacity of 10,000 to 30,000 persons, and others even for a much larger number. The theater of Marcellus at Rome, whose external walls are still in existence, had a seating capacity of 30,000 spectators.

The theaters of Greece were semicircular, resembling the half of an amphitheater, and that part in which the chorus sang and danced was called the orchestra. The stage for the performers was behind the orchestra, facing the audience, and back of the stage was a permanent and finely decorated scene. The large paintings at the rear of the stage represented landscapes or buildings, as might best serve the purpose to convey a vivid impression in connection with the players and the plot of the drama. Roman theaters were similarly constructed, but the space between the stage and the audience was reserved to the senators instead of being occupied by the chorus. However, they were built on level ground instead of being hewn or cut in the side of a hill. The seats were arranged in tiers on a concentric plan and the buildings were not covered by a roof, but the portion containing the stage and chambers connected with it was usually surrounded by a portico.

Stage scenery was entirely unknown in the early period of the theater, but later it was introduced gradually, though the Romans employed stage effects of more elaboration than was the custom in Greece. Pericles made the theaters free to the public, the expense being borne by the government, and the scenes presented were of a character designed to teach the people history, poetry, oratory, and other branches of useful knowledge. The theater declined with the decadence of Rome, and the only theatrical entertainments given during the Middle Ages consisted of the miracle plays, interludes, and mysteries, which were presented in many places in the churches and cathedrals, as well as in halls and convents. In many cities theatrical plays were acted in the open air.

The modern theater dates from the revival of classical literature in the 16th century, when the classical drama was revived. Among the first theaters of modern times is the one opened in Paris by the Confraternity of the Trinity in 1548, at which secular performances were given. The first to be erected in Italy was completed in Florence, in 1581, and one of excellent architectural design was built at Parma in 1618. In 1576 the first theater was erected in England, known as the London Theater, and about the same time were constructed the playhouses in Whitefriars, in Blackfriars, and the Curtain in Shoreditch. The playhouse in Blackfriars be-

came famous because of being the scene of Shakespeare's plays, and the success attending them stimulated many others to write and act dramatic productions. Cardinal Richelieu built the Palais Royal in Paris in 1639, which, in the time of the Revolution, became one of the most famous theaters of Europe, being then known as the Theatre Français. France now has theaters of great beauty and artistic dignity, and the Grand Opera of Paris still ranks among the largest and finest in the world.

The first theater built in America was opened at Williamsburg, Va., in 1752, but performances in halls and other buildings date practically from the first settlements. The theaters of Germany are noted for paintings of very high artistic merit and splendid decorative effects in connection with stage scenery. Gas was first used in a Parisian theater in 1822, but electric light has gone into use in practically all the larger theaters, its effect in general lighting and for scenic flashing being the most beautiful. Theaters are controlled by national laws in most European countries, but in the United States and Canada they are regulated and licensed by the municipal corporations in which exhibits are given. The property is not only subject to general taxation, but in most towns and cities strolling companies are required to pay a license, while in some places an annual license is charged to the owner of the building. The larger theaters of North America include the Metropolitan Opera House, New York, and the Majestic and the Auditorium, Chicago. However, they are inferior to the great theaters of Europe, such as the Paris Grand Opéra, which cost \$4,000,000.

THEATINES (the'a-tinz), an order of monks in the Roman Catholic church. It was founded by Pope Paul IV. in 1524, who was then bishop of Theate, hence its name. Formerly it had a large membership in Spain, Portugal, and France, but at present it is represented chiefly in Italy. The main object is to oppose heretics, to reform the clergy, and to

attend the sick and criminals.

THEBES (thebz), a celebrated city of ancient Egypt, which was for centuries the capital of that country. It occupied an extensive site on both sides of the Nile, about 300 miles south of Cairo, and is thought to have been founded by Menes, the founder of the Egyptian monarchy. The river divided the city into four parts, two being on each side of the Nile. Those lying on the east bank were known as Karnak and Luxor, and those on the west bank, as Gurnah and Mendinet-Habu. The city had its greatest prosperity for the five centuries included between 1500 and 1000 B. C., and it began to decline rapidly about 800 B. C., when Memphis, the ancient capital of the Pharaohs, rose to importance as a rival city. No ancient city contains more splendid ruins than Thebes, but now only a few Arabs occupy its site, who earn their subsistence by directing tourists to the different places

of interest. The Palace of Luxor and the Temple of Karnak, of which ruins still remain, occupied imposing sites on the east side of the Nile, and in front of the former were beautiful obelisks of red granite. One of these obelisks is now in Paris, in the Place de la Concorde.

Thebes was the seat of the cemeteries of the Theban monarchs, in which fine sepulchers were hewn in the rock, and from them thousands of mummies have been taken. On its site are the remains of extensive temples, palaces, and monuments. The notable statues include the one of Memnon, which is in ruin. This art product was supposed in early times to give out at sunrise a sound like the twanging of a harp string, but it is thought that the sound was made by a person concealed within. Other objects of interest include the Memnonium or temple of Rameses II., the temple and palace of Rameses III., the tomb of Sethi I., and the portico of Shishak I. Thebes was able to send forth powerful armies of charioteers, who enriched its temples and palaces with the wealth brought from Ethiopia, Arabia, and Asia Minor. It is estimated that the Persians obtained \$10,000,000 in valuable spoils at the time Cambyses plundered the city in 525 B. C., but it was not finally destroyed until about 86 B. C.

THEBES, a city of Greece, in Boeotia, thirty miles northwest of Athens. The ancient city occupied a mountain slope between two streams and is said to have been founded in 1500 B.C. by Cadmus, after whom it was named Cadmea. This name was afterward applied only to the ancient citadel, while the enlarged city was named Thebes. Little is known of its history prior to the 6th century B. C. aside from the fact that it had an aristocratic constitution and claimed sovereignty over the other towns of Boeotia. Its relations to Athens were generally unfriendly, hence it sided with Xerxes at the time the Persians invaded Greece, but was saved from a retaliatory attack of the Athenians by the intervention of Sparta. Thebes sided with Sparta in the Peloponnesian War, but, when Sparta became the predominating influence in Greece, it gave shelter to the exiles from Athens, who were compelled to flee from their city by the oppressive rule of the Thirty Spartan Tyrants. This occasioned a prolonged war between Thebes and Sparta, but the former became victorious in 362 B. C., as a result of the heroic leadership of Epaminondas, and thus rose to the foremost political power in Greece.

However, Athens prospered and again rose to contest for supremacy, but under the leadership of Demosthenes the two cities united against Philip of Macedon. This military leader had invaded both Attica and Boeotia with a powerful army, and in 338 B. c. defeated the allied Thebans and Athenians at Chaeronea, thus crushing Grecian libertics. Thebes revolted against Alexander the Great in 335 B.C., but that general made short work of the city by slaying 6,000

Thebans and carrying 30,000 away as slaves. Cassander rebuilt the city in 315 B. C., but it was taken by Demetrius Poliorcetes in 290 B. C. and never again rose to importance. It sided against the Romans in the Mithridatic War in 86 B. C. and was plundered by Sulla. In the period between the 10th and 12th centuries Thebes became celebrated for its manufacture of silk and cloth, but was plundered by the Normans of Sicily in 1143, and when the Crusaders captured Constantinople, in 1204, it was made a fief of the feudal empire. The present town of Thebes occupies the ancient citadel of Cadmea. It is the seat of a bishopric and has a population of 3,875.

THEINER (tī'nēr), Augustin, author, born in Breslau, Germany, April 11, 1804; died in Civita Vecchia, Italy, Aug. 10, 1874. He studied at Breslau and the University of Halle, and soon after made an extensive tour through Austria, Switzerland, and France to consult libraries and Subsequently he settled in Rome, where he became a member of the oratory of Saint Philip Neri. He was made keeper of the secret archives of the Vatican, a position he held for a number of years, but was removed from office in 1870 on a charge of having furnished documents in opposition to the dogma of infalli-His brother, Johann Anton Theiner (1799-1860), was a noted author and teacher. He instructed a number of years at Breslau, officiated as a Roman Catholic priest from 1830 to 1845, and was made secretary of the Breslau library in 1855. The former wrote partly in Latin and partly in German, his works including numerous treatises on religious doctrines and practices, while the latter is the author of numerous works in German. His principal publications include "Reformatory Measures in the Catholic Church," "Treatises on the Doctrine and Life of Catholic Priests," and "Spiritual Christianity.'

THEISS (tīs), or Tirza, a river in Hungary, which rises in the Carpathian Mountains and, after a course of 825 miles, joins the Danube about twenty miles above Belgrade. The source in the Carpathians is by two branches, the White Theiss and the Black Theiss, and its general upper course is toward the northwest, but it makes a bold curve in north central Hungary and flows toward the southwest, while its lower course is almost parallel to the Danube for 300 miles. The Körös and Maros are its principal tributaries. It is remarkably rich in fish and is navigable to Szolnok. The towns on its banks include Szegedin and Zenta.

THEMIS (the mis), in Greek legends, the goddess of justice, law, and order. She was the daughter of Cronus and Rhea and the wife of Zeus, and presided over the assemblies of the people and the laws of hospitality. Zeus frequently consulted her, owing to her great wisdom. She is represented in statuary in the full maturity of womanhood. In the right hand she holds the sword of justice and in the left the

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scales, while her eyes are blinded by a bandage so the personality of the individual should carry no weight with respect to the dispensation of justice. In more recent Greek writings Themis is represented as a daughter of Uranus and Gaea, but all agree that she possessed the gift of prophecy.

THEMISTOCLES (the-mis'to-klez), general and statesman of Athens, born about 514; died in Magnesia, Asia Minor, about 449 B.C.



THEMISTOCLES.

He descended from an obscure family, but received a liberal education, and in 484 B. C. rose to the leadership of political affairs in Athens. He was the opponent of Aristides the Just, whom he succeeded in the leadership, and immediately engaged workmen to construct a powerful fleet to oppose an invasion of This the Persians. fleet he commanded in the battles of Artemisium and Salamis,

in 480 B.C., where the Persians were defeated with great loss, though he intrusted the chief command to Eurybiades, a Spartan. This victory caused his fame to rise with remarkable rapidity and he was intrusted with the most important public offices, but personal aggrandizement caused him to be exiled in 471 B. C. He first sought refuge in Argos, but soon fled on account of being charged with treason, and found favor at the court of Artaxerxes, King of Persia. At the Persian court he learned the language and usages of Persia and was later appointed to the government at Magnesia, where he remained until his death. A monument was erected to his honor at Magnesia, but his bones were afterward taken to Attica. Nepos and Plutarch wrote the history of his life.

THEOCRACY (the-ok'ra-sy), a form of government in which men recognize the immediate sovereignty of God and receive his revelations as civil law. The most famous example of a theocracy is that of the Israelites, to whom the law was given by God through Moses, and it continued to be the form of Hebrew government until the time of Saul. In such a government the priesthood or a class of ecclesiastics become the interpreters of the divine commands and serve as the officers both in political and ecclesiastical matters.

THEOCRITUS (the-ok'ri-tus), eminent Greek poet, born in Syracuse, Sicily, and flourished about 275 B. C. Little is known of his life aside from what was mentioned by other writers, but numerous productions of value are attributed to him. He visited Alexandria, Egypt,

in the time of Ptolemy Soter, where he studied and began to write essays. Ptolemy Philadelphus, who assisted his father, Ptolemy Soter, in the Egyptian government, patronized him and mentioned him favorably in three of his poems. Subsequently he lived at the court of Hiero II., of Syracuse, where he spent much time in writing historical accounts of Sicilian life and essays and poetry. His idyls of Sicilian life include about thirty. He is the author of twenty-two epigrams and a poem entitled "Berenice."

THEODOLITE (the-od'o-lit), an instrument used in surveying for measuring angles, both horizontal and vertical, that is, altitude and azimuth. It consists of a small telescope, which can be moved up and down, and the inclination is shown by a graduated circle called the altitude circle. In most instruments the telescope is so mounted that it can be twisted around a vertical axis so as to permit measuring the angular distances of objects of the north point, that is, Various forms of construction have azimuth. been followed in making these instruments, depending upon whether they are to be used in astronomical or other measurements. Railroad surveyors usually employ the transit instead of the theodolite.

THEODORIC (the-od'o-rik), King of the Ostrogoths, born near Vienna, Austria, in 455; died in 526 A.D. He was the son of Theodemir, King of the Ostrogoths, and in 475 succeeded his father on the throne. His early life was spent at Constantinople, where he was a hostage at the court for ten years, and there received special training in connection with the children of Emperor Leo. He returned to his native country in 473 and immediately demonstrated his ability as a warrior and military tactician by securing concessions in Dacia and Moesia, and on the death of his father, in 475, was hailed as the chief of his valiant but warlike kinsmen. A war soon broke out between the Ostrogoths and Zeno, emperor of the Eastern Empire from 471 to 491, but the latter saved his capital by persuading Theodoric to invade Italy against the usurper Odoacer, which he did in 488 with an army of 200,000 men. The Ostrogoths were successful near Aquileia in 489, and the following year surrounded the enemy in Ravenna, which they captured after a siege of three years, and Odoacer was treacherously murdered at a banquet in 493. Theodoric immediately assumed the title of King of Italy, which he governed with remarkable vigor and ability, and successfully resisted the claim of a protectorate preferred by the Eastern emperor. The Franks were expelled from the territory belonging to the Ostrogoths, an insurrection was quelled in Spain, and material improvements were fostered in the civil and industrial affairs of Italy. Though an Arian, he tolerated all forms of Christianity, patronized learning, and established an efficient system of justice. In his long reign of 35 years Italy prospered more substantially than it had for some centuries before. He is mentioned as Dietrich of Berne in the "Nibelungenlied."

THEODOSIUS (the-o-do'shi-us), surnamed The Great, Emperor of Rome, born near Segovia, Spain, about 346; died Jan. 17, 395 A.D. He was a son of the eminent Roman general Theodosius, whom he accompanied on a campaign through France and Britain in 368, and assisted in expelling the Caledonians from South Britain. His father was murdered at Carthage, in 376, and Theodosius routed the Sarmatians in Moesia, but soon after retired to his estate in Spain. Emperor Gratianus called him from retirement in 379 and made him governor of Dacia, Macedonia, Thrace, Egypt, and the East. Soon after he expelled the Goths from the Eastern provinces, and concluded a peace with them in 382. Later he won the friendship of the Goths by treating them, while his captives, with marks of kindness, and many of the warriors joined his army.

Gratian, ruler of the Western Empire, had been murdered in 383 and his throne had been seized by Maximus, but Theodosius, in 387, undertook to restore the throne to Valentinian II., brother of Gratian, which he accomplished by capturing and putting to death the usurper at Aquileia. However, Valentinian was strangled in 392 by General Arbogastes, and Theodosius made a second invasion of Rome, defeating and slaying Arbogastes in a decisive battle. Thus elevated to mastery of the whole Roman Empire, he practiced great cruelty in suppressing an insurrection in Thessalonica, in which 7,000 people were ruthlessly murdered by his soldiers in an amphitheater. Though a Christian, he was refused communion by Saint Ambrose on account of this crime until after being humiliated for eight months. The empire was left to his two sons at his death, Honorius receiving the western portion and Arcadius the eastern.

THEOLOGY (the-ol'o-jy), a term employed by classical authors to describe treatises on the nature and worship of the gods, such as Hesiod's "Works and Days" and Cicero's "Natura Deorum." It is now applied to the science which treats of God and the relations of God and man, and has special reference to the present condition and ultimate destiny of mankind. The two generally recognized divisions are natural, or philosophical, theology, which seeks a knowledge of God through the light of nature and reason, and positive, or revealed, theology, which embraces and systematizes the doctrines contained in the various books of the Bible. The theologies of all Christian churches are based chiefly on the New Testament. The earliest interpretation of the New Testament doctrines was made by the Apostolic Fathers, and later by the so-called Fathers of the Church. Doctrines were stated primarily in general terms and subsequently they were expounded by theologians, but ultimately clear and precise form was given to them by decisions promulgated through councils. Protestant theology had its beginning with Luther and Zwingli, who asserted their right to interpret Scripture by private judgment. On the other hand, the theology of the Catholic churches is founded on the consensus of the fathers, on council decisions, and opinions promoted by the pontiffs. For this reason it is based less directly on individual investigations than that of the Protestants.

THEOPHRASTUS (the-o-fras'tus), Greek philosopher, born at Eresus, in Lesbos, in 322; died in 287 B. C. He studied at Athens under Plato and Aristotle and became the successor of the latter in the lyceum. As the head of the Peripatetic school of philosophy he attracted several thousand students from all parts of Greece, and by his popularity and influence excited the jealousy of a strong party against him. At one time he was brought before Areopagus on a charge of impiety, but he plead his own cause so ably that he was acquitted. He did not develop a new system of philosophy, but expounded that of Aristotle. Although he is the author of many works on law, oratory, legislation, and traits of human character, practically all have been lost. Several of his works on botany are extant, and one of his treatises on character is in existence. The latter contains sketches from the mimic life of the stage, and many editions of it have been issued.

THEOSOPHY (the-os'o-fy), a term applied to a so-called sacred science. It differs from the science of philosophy and theology in that it professedly derives its knowledge of God from immediate communications with the Deity, instead of generalizing from phenomena to the being and attributes of God, as in philosophy, and instead of contenting itself with the relations of the soul to God, as in theology. Theosophy is closely related to mysticism, although the latter includes more in its scope. It dates from remote antiquity, but in its newer application arose from the organization of the Theosophical Society founded by Colonel Alcott in New York in 1875, who advocated the formation of a universal brotherhood. The tenets of modern theosophy are best set forth in "The Secret Doctrine," published by Madame Blavatsky, a Russian writer.

The theosophists teach that man possesses elements of essential divinity, but that the underlying principle of all manifestation is infinite and eternal and may be known through its spiritual and material manifestations. Throughout the universe, embracing the physical, mental, psychic, and moral planes, run a unity of consciousness and a unity of law. Some of the leading supporters of this system of thought hold that the divine principle manifests itself through occult phenomena, in which respect their tenets are somewhat allied to spiritualism. The Universal Brotherhood is an outgrowth of the Theosophical Society and was founded in New York, Jan. 13, 1898, by Katharine A. Tingley.

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It teaches the study of ancient and modern religion, philosophy, art, science, the divine powers in man, and the law of nature. At present the American section has 3,250 members, confined largely to the United States and Canada, and affiliated organizations are maintained in nearly all the countries of Europe.

THERAPEUTAE (ther-à-pū'te), an ascetic sect among the ancient Jews, sometimes closely associated with the Essenes. They had their seat near Alexandria, in Egypt, and were ardent as students of the law of Moses. In their religious work they were secluded, spending much of the time in meditation. They are described in a treatise by Philo, who credits them with observing the Sabbath and other Jewish festivals.

THERAPEUTICS, the branch of medicine which treats of the action of drugs and other remedies upon the diseased system, or the means that may be used in assisting nature to restore health. It embraces a knowledge of the nature of diseases and the drugs or curative agents to be employed in treating them. Such knowledge is obtained by experimental investigation on animals as well as man, and the facts learned are to be considered in applying the remedies in treating the diseases common to mankind. The subject has been divided into rational therapeutics and natural therapeutics, the former having reference to the action of drugs as curative agents and the latter proposing to cure disease more particularly through natural laws. In the former the physician aims to apply remedies for their specific effect, while in the latter he supports the strength of the patient by administering food as a part of the mode of treatment. The term electro-therapeutics has come into use through the application of electricity in medi-Where a physician attempts to treat the symptoms rather than the causes, the practice is said to be symptomatic therapeutics. Any remedy that is known to cure a disease, as quinine in the treatment of malaria, is termed a specific.

THERESA (te-re'sa), Saint, or Teresa, the favorite saint of modern Spain, born in Avila, Spain, March 28, 1515; died Oct. 4, 1582. The death of her mother caused her father to place her in an Augustinian convent, but not with the view of leading a secluded religious life. However, she took the veil in a Carmelite convent in 1535, when she gave up her name of Theresa de Ahumada and assumed that of Theresa de Jesus. She was at first disappointed by the loose discipline in the order, and accordingly founded a convent of reformed Carmelite nuns at Avila in 1562. Subsequently she established 28 other convents of the reformed order, known as the Barefooted Carmelites. She wrote a history of her work in founding these convents, produced several writings of a devotional nature, and published an autobiography. Pope Gregory XV. canonized her in 1621.

THERMAL SPRING (ther'mal), the name applied to any spring whose mean annual temperature is higher than that of the locality where it is located. Thermal or hot springs range from some found in localities of a cold climate, whose temperature may be a few degrees higher than the freezing point, to those whose waters are heated to the boiling point. The causes of such springs are found in the interior heat of the earth. They usually occur in volcanic regions, where the water flows through a portion of the earth's crust that is highly heated. In many instances these springs are found in districts that are not subject to volcanic eruptions, at least not in recent geological times, and in that case they may be assigned to the heating influences of gaseous emanations from the interior of the earth. Many of the thermal springs have medicinal properties, while others yield minerals of value, such as sulphur, salt, or magnesia. Among the noted thermal springs are those of the Yellowstone National Park, Wyoming; the Rocky Mountain Park, Alberta; at Hot Springs, Ark.; and the geysers of Greenland.

THERMOELECTRICITY (ther-mo-e-lektrīs'ī-ty), the branch of electrical science which treats of the properties and action of electricity developed by heat. If two bars of unlike metals, such as antimony and bismuth, or copper and iron, are soldered together at one end, the other end being connected by a conductor and heat being applied, an electro-motive force will be produced and a current of electricity will flow in a certain direction through the circuit so provided. A current of electricity will likewise be produced if the soldered end be cooled, but it will flow m an opposite direction. In practice, the face of the pile, as a number of thermoelectric couples thus formed are called, is turned toward the source of heat, such as a polarized beam from an electric lantern. A galvanometer is then placed in the circuit of the pile and equilibrated. Any increase or diminution of the temperature in the beam is at once shown by the movement of the galvanometer needle. Currents of electricity produced by a thermopile, or battery, will continue to flow as long as there is any difference of temperature between the opposite ends of the bar. While a single couple, or cell, as the simple arrangement is called, will produce a weak electric current, considerable force may be developed by a thermoelectric pile, or battery.

THERMOGRAPH (ther'mo-graf), an instrument for automatically recording variations of temperature. It consists essentially of some form of metallic thermometer, to which is attached a circular disc of paper, and a pen is so connected that it moves vertically over the surface of the sheet. In most instruments the sheet of paper is drawn horizontally by clockwork so attached that it makes a complete revolution in 24 hours. The surface of the paper disc is graduated into spaces indicating minutes and hours, and degrees of temperature are shown in the spaces set off by concentric circles. Since the disc makes a complete circuit in a day, it is possible to read off the temperature at any given time. By replacing the disc daily and filing it for reference, a complete record of the temperature for a series of days may be preserved.

THERMOMETER (ther-mom'e-ter), instrument for measuring temperature, or the intensity of heat, by means of a gas or liquid. It is based on the property that heat possesses of expanding bodies. The expansion of matter is proportional to the degree of heat applied, but it varies greatly in different substances, being greatest in gases, less in liquids, and least in A thermometer consists of a long, straight tube, with a small internal diameter, closed at the upper end and widened at the lower end into a bulb of cylindrical shape. The bulb contains a quantity of mercury and the small internal bore or diameter, which must be of equal size throughout, is exhausted so as to produce a vacuum. The mercury rises in the tube when the thermometer is taken into a warm place, owing to the expanding influence of the warmer surroundings, but it contracts when taken into a cold place, thus causing it to fall in the tube.

In making a thermometer, the tube is first carefully formed, and the bulb and part of the tube are filled with cold mercury before the tube is closed at the top. The bulb is carefully heated a little hotter than the highest degree of heat to be indicated by the instrument, thus causing a portion of the mercury to flow out at the top, thereby driving out all the air. The upper end of the tube is sealed before being cooled, which is done by being melted in the flame of a blowpipe. A vacuum is left in the tube as the mercury cools and accumulates in the bulb. The tube is next graduated, or marked off into degrees. This is done by placing it into boiling water and afterward in contact with melting ice, thus ascertaining the boiling and freezing points. These points are marked off into degrees, and the parts of the tube below the freezing point and above the boiling point are similarly divided into degrees of the same length.

Three kinds of thermometers are in general use at present. They are the Fahrenheit, Reaumur, and Centigrade. The Fahrenheit thermometer, invented by the German physicist, Gabriel Daniel Fahrenheit (1686-1736), is in general use in America and the countries under the government of Great Britain. In this thermometer the freezing point is marked 32° and the boiling point, 212°. The inventor placed zero 32° below the temperature of freezing water because he considered that to be absolutely cold, but that point is now estimated at 492° below the freezing point according to his scale. In the Reaumur scale the freezing point is marked zero and the boiling point is 80°. It is the thermometer used in Germany. The Centigrade thermometer is at present in general use among the scientific men all over the world and in most European countries. The freezing point in the Centigrade scale is zero and the boiling point, 100°.

Degrees on all thermometers above zero are termed + degrees, while those below zero are termed - degrees. Mercury can be employed in the Fahrenheit scale only between -40° and +661°, since it freezes at 40° below zero and boils in a temperature raised to 661°. Alcohol colored red is therefore used in thermometers designed to register low temperatures, being serviceable in a pure state to indicate temperatures exceeding -100°, but it is of less value than mercury in registering high temperatures, since its boiling point is much lower. Selfregistering thermometers are designed to record the highest or lowest temperatures reached within a certain period, and to this class belong instruments that record all the changes undergone at different times. To reduce degrees of one scale to those of another, the following formula will serve, the respective scales being represented by the initial letters:

> $C=\S$ $(F-32)=\S$ R. $F=\S$ $C+32=\S$ R+32. $R=\S$ $(F-32)=\S$ C.

THERMOPYLAE (ther-mop'e-le), or Pylae, a famous pass mentioned in ancient history, the only one through which an invading army may pass from northern into southern Greece. It is situated south of the Sperchius River, forming a narrow passway between Mount Oeta and the Maliac Gulf. In its course are several hot springs, hence the name Thermopylae, meaning the Hot Gates. The Spartan king, Leonidas, made the pass famous in history by attempting to prevent the mighty Persian army under Xerxes, in 480 B.C., from overrunning southern Greece and capturing Sparta. His army numbered 7,000, but he selected a band of 300 Spartans to make a gallant stand against the invaders, who had been informed of the pass by a Thessalian. The defile was pointed out in the same way by a traitor to the Gauls under Brennus, who, in 279 B.C., forced the Greeks to retire. The pass has become widened by natural causes into a swampy plain, and is now of little importance as a strategic point.

THESEUM (the-se'um), the name given by the Greeks to any building dedicated to Theseus. The largest and most celebrated temple sacred to him was located at Athens and appears to have occupied a site not far from the Acropolis. It was built about 473 B.C., when the remains of Theseus were removed from the island of Scyros to Athens. At present the name is applied to a temple on the west side of the ancient Agora, though it is not identified with the Theseum dedicated to Theseus. This structure is in the Doric style and is well preserved. Formerly it was used as a museum of art and history, but the interior has been remodeled as a Greek church. Many sculptures of note are within the building, taken chiefly from the myths of Theseus and heroes of the age of Pericles.

THESEUS (the'sus), in Greek legend, a famous king of Athens, son of King Aegeus and his queen Aethra, noted for his heroism. His most famous exploit was that of slaying the Minotaur, thus freeing Athens from the obligation of sending annually seven youths and seven maidens to be devoured by the Cretan monster. Ariadne, daughter of King Minos of Crete, became enamored of Theseus, gave him a sword to kill the monster, and described the clue of thread with which to escape from the labyrinth. On leaving Athens he promised to display white sails in case he succeeded in his enterprise, thereby to give the people notice that he had succeeded, but in the moment of success his pledge was forgotten and the ship returned with its usual display of black flags. His father, seeing black instead of white flags, immediately hurled himself into the sea.

After Theseus ascended the throne of Athens, he conducted successful wars against the Amazons and the Centaurs and reorganized the Athenian festival. His government is described as one of mildness and popularity. He married Phaedra, sister of Ariadne. However, she fell in love with Hippolytus, the son of Theseus and Antiope, but, as the youth did not return feelings of affection, she accused him wrongfully to his father. In a fit of anger Theseus implored Neptune to destroy him, when Phaedra hanged herself in remorse. Sophocles and Euripides made the story of Phaedra the subject of a tragedy.

Theseus carried Helen from Sparta to Athens, which caused Castor and Pollux to imprison him in the underworld, and in his absence the Athenians revolted. He was finally killed on the island of Scyros by King Lycomedes, but his body was returned to Athens about 469 B.C. and was placed in the famous temple called *Theseum*. This temple served as a sanctuary for the poor and was a retreat for slaves when they were treated cruelly. The Greeks had a tradition that Theseus came from the spirit world and fought on the side of the Athenians in the Battle of Marathon.

THESSALONIANS (thes-sa-lo'ni-anz), Epistles to the, two books of the New Testament, addressed by Saint Paul to the church at Thessalonica. The first of these books was probably the earliest of all the epistles written by Saint Paul and was likely prepared while he was at Corinth, when Silas and Timothy had returned from Macedonia, about the year 52. It may be divided into two parts, one referring to the condition of religious work among the people to whom it is addressed, and the other instructing them in Christian duties and the fate of the dead at the expected return of Christ. The second epistle was written about one or two years later, and aims to correct some mistakes respecting the coming of Christ. Paul commends the Thessalonians for their patience and faith in their persecutions, and refers to the

coming of the Antichrist prior to the return of Christ.

THESSALONICA. See Salonica.

THESSALY (thes'sa-li), an important state in ancient Greece, the largest political division in that country. It occupied the region between the Pindus Mountains and the Aegean Sea, extending from the Khassia Mountains in the north and the Othrys Mountains in the south, corresponding nearly to the limits of the government of Thessaly in modern Greece. Within this region is the plain of Thessaly, supposed formerly to have been an interior lake, which is drained by the Salambria River (anciently the Peneus), and forms the most fertile tract of land in Greece. This region was originally occupied by the Aeolians, when it was called Aeola, but these inhabitants were divided into separate confederacies and subsequently were driven southward to Boeotia or reduced to serfdom. Philip of Macedon conquered Thessaly in the 4th century B. C. and in 344 B. C. made it subject to Macedonia. It was incorporated as a part of the Roman Empire in 197 B. C., fell to the Eastern Empire after the decline of Rome, and in 1355 A. D. came under the Turks. The Berlin Congress of 1878 restored the larger part of Thessaly to Greece, but additional annexations were made in 1881, thus giving Greece the larger part of the fertile region lying in the Salambria basin. It is traversed by several lines of railroad and has excellent cereal and fruit farms. Larissa is the capital.

THETIS (the tis), in Greek legends, the daughter of Nereus and Doris, the wife of Peleus, the mother of Achilles. Her marriage to Peleus was desired by the gods, who had predicted that her son would be greater than his father. The wedding was attended by all the gods except Eris, who became angered and as a revenge threw the apple of discord among the guests.

THEURIET (te-rya'), Andrew, poet and novelist, born at Marly-le-Roi, France, Oct. 8, 1833. He pursued a course of law in Paris, was admitted to practice in 1857, and soon after entered the office of the ministry of finance, but, being of a literary turn of mind, contributed to magazines and wrote a number of poems and sketches. His "In Memoriam" was published in 1857. He was elected to the Academy in 1896. His chief works are "Reine des Bois," "Jean-Marie," "Frida," "La soeur de lait," and "La maison des deux Barbeaux."

THIAN SHAN (tė-an' shān), an elevated mountain system of Central Asia, which is situated in western China and extends into Turkestan. It trends a distance of 1,500 miles from east to west and contains many peaks towering 10,000 to 21,000 feet above the sea level. The loftiest summit is Tengri-Tagh, height 21,215 feet. Spurs of the Thian Shan Mountains penetrate into the Desert of Gobi. Many of their summits extend above the snow-line, but the slopes are well timbered.

THIBET. See Tibet.

THIERS (tyâr), Louis Adolphe, statesman and historian, born in Marseilles, France, April 16, 1797; died Sept. 3, 1877. He was the son of a locksmith and, after attending the lyceum in his native town, he studied law at Aix and began the law practice at Paris. His struggle for success was against poverty, but he soon abandoned law to take up the career of a journalist and writer. His first contributions to the press were published in the Constitutionnel, a political journal of Paris, and his productions on art, politics, and the drama were alike interesting. In 1823 he published the first two volumes of his "History of the French Revolution," a work that gained much popularity, of which the last two volumes were issued in 1827. This production ultimately brought him a fair income, which enabled him to found the National, a periodical devoted to the dissemination of demo-cratic principles. He was largely instrumental in bringing about the Revolution of 1830, and rapidly rose to power and influence in the chamber of deputies.

In 1832 Thiers was made minister of the interior, in 1836 became foreign minister, and in 1840 was chosen president of the council. He resigned from the last mentioned position after serving six months and devoted himself to literature, and in the meantime visited the scenes of historic battles in Germany, Spain, Austria, and Italy. He was elected to the assembly after the Revolution of 1848 and was an active supporter of Louis Napoleon for the presidency, but afterward became his opponent. His opposition to the formation of a new empire caused his arrest and banishment in 1851, but he returned to France and lived in retirement until 1863, when he again entered the assembly as deputy. He opposed the war with Germany in 1870, predicting disaster to France, but vigorously supported the conflict after it had begun. In 1871 he was elected to the national assembly of the new republic, being at once appointed to exercise executive power, and on Aug. 31, 1871, was given the title of president. He directed public opinion in favor of permanently organizing a government in the form of a republic, but opposition to his advanced position caused his retirement from office. Thiers was made a member of the French Academy in 1836. His writings include an autobiography. His chief works are "The Consulate of the Empire" and "History of the French Revolution."

THIRLWALL (ther's wal), Connop, historian, born in London, England, Jan. 11, 1797; died July 27, 1875. He studied at Trinity College, Cambridge, where he became a fellow and tutor after graduation, in 1818. Subsequently he studied law and was called to the bar. In 1828 he took orders in the Church of England. He was made rector of Kirby Underdale, Yorkshire, and soon began to give attention to literary work. In 1840 he was made bishop of Saint

Davis, in Wales, where he conducted services in the Welsh tongue. His chief historical work is "The History of Greece," a work published in eight volumes. He made a translation of Schleiermacher's "Critical Essay on the Gospel of Saint Luke" and Niebuhr's "History of Rome." His "Letter to a Friend," a fine literary product, was edited by Dean Stanley.

THIRST, the sensation caused by the need of water in the body, which is relieved by drinking. It is accompanied by febrile excitement and usually by excessive heat, and is followed by a sensation of fatigue and weakness. The excessive use of salt is a familiar cause of thirst and is explained by the presence of too much salinity of the blood. Some diseases, such as diabetes and cholera, are accompanied by great thirst. The craving for water while in a state of thirst is explained by a reduction in volume of the fluids of the body, and these are more saline under such a condition. Relief may be obtained not only by drinking water, but also by injecting fluids into the veins. Drinks that contain a small quantity of acid are most effective in relieving thirst, since they stimulate the action of the salivary glands.

THIRTY TYRANTS, the name of a body of rulers in Athens, who were chosen as magistrates after the close of the Peloponnesian War, in 404 B.C. They were native Athenians of the aristocratic party, and were chosen by the conquering Spartans with the hope that their government would prove unpopular to the democracy. These rulers were cruel and oppressive in their official acts and after one year they were expelled under Thrasybulus, who had been exeiled by them. As a result of the Battle of Piraeus, in which he commanded, the democratic form of government was restored to Athens.

THIRTY YEARS' WAR, the name of a conflict in Central Europe, whose seat was chiefly in Germany. It was a struggle between the Protestants and Roman Catholics for supremacy. and extended from 1618 until 1648. The Treaty of Augsburg, concluded in 1555, had virtually ended the Reformation, and by its terms each of the states was permitted to choose its national religion. It had been planned to provide regulations under which each state might have uniform religious interests, hence all subjects were permitted to remove to states where their faith was sanctioned officially, but the inconveniences of removals overcame the desire for settling elsewhere than in the states to which the parties interested were subject. Differences in questions of government soon arose, and the growing strength of Protestantism in Bohemia and Austria caused a reaction to set in under the influence of the Jesuits. As a means of mutual protection, the Evangelical Union was organized by the Protestants in 1608, and the Catholic League, or Holy League, was formed the following year. Ferdinand of Styria, who had been educated by the Jesuits, became King of Bohemia in 1617.

He immediately showed favors to the Catholics and caused many of the Protestant churches to be closed. In 1618 the Protestant estates petitioned Emperor Matthias of Austria for relief, but that monarch declared their meeting illegal.

The Protestants, under the leadership of the Count of Thurn, on May 23, 1618, expelled two representatives of the emperor from the royal palace at Prague. This action was taken as a protest against the infringement of the crown against religious liberty and was the immediate occasion of the beginning of the war. Both Protestants and Catholics took up arms in defense of their faith. The concessions to Protestants in Bohemia were withdrawn by the authorities, and this act was immediately followed by an uprising. In 1619 the Protestants chose Frederick V., the elector Palatine, as King of Bohemia. The Catholic forces were repeatedly defeated by Count Thurn, but Maximilian of Bavaria defeated him at Weissemberg in 1620. An army of Spaniards under Spinola came to the relief of the Catholics, and the defeat of the Protestants upon the field was followed by persecution.

The seat of war was carried farther west immediately after the Protestant losses in Bohemia and for some time had its center in the Palatinate. The Protestant forces under Count Mansfeld were successful in holding their position on the Rhine, where they retaliated in 1621 for the tyranny shown by Ferdinand II. of Austria, formerly King of Bohemia. However, Tilly, the imperial commander, gained a victory at Wimpfen, in 1622, and the following year defeated the Protestants at Höchst and Stadtlohn. The war would likely have ended with these victories, but the Protestant princes in the north, fearing the growth of Catholic influence in the southern part of Germany, became aroused.

Christian IV., King of Denmark, joined the Protestant cause in 1624. He was supported by Holland and a British subsidy. His forces joined those of Mansfeld and Christian of Brunswick, and these forces took strong positions in Lower Saxony. Emperor Ferdinand was supported by two noted commanders, Wallenstein, the commander of the imperial army, and Tilly, the leader of the Holy League. In 1626 the Danes were defeated at Lutter by Tilly and at Dessau by Wallenstein. They overran Denmark and the northern part of Germany and Christian IV. was compelled to sign a treaty of peace at Lubeck in 1629. In the meantime Mansfeld gathered a powerful army and conducted a vigorous campaign in Moravia and Hungary.

The Swedish-German period of the war began in 1630, when Gustavus Adolphus, King of Sweden, came with a powerful army into Germany as a support to Protestantism. Ferdinand of Austria had previously ordered the restitution of certain estates to the Catholic church, an edict that was unpopular among many Catholics and an offense to the Protestants. The Swedish

army landed at Usedom and drove the imperialists out of Mecklenburg and Pomerania, and the Swedish king concluded alliances with a number of German states, including Hesse, Brandenburg, and Saxony. Tilly captured Magdeburg in 1631 and permitted the city to be plundered and many of the inhabitants to be slaughtered. The armies met near Leipzig, at Breitenfeld, where Tilly was defeated with great loss. Gustavus followed up his victory by advancing toward the south and east, and defeated his enemy on the Lech, in 1632, where Tilly was slain. His plan of campaign included the establishment of powerful organizations as a support to his cause, and Sweden soon became the head of the Evangelical Union. Wallenstein had been previously disgraced, but Ferdinand now recalled him as a means of checking the powerful advance of the Protestants. He promptly invaded Saxony, where the armies met on the field of Lutzen, in 1632. While Wallenstein was signally defeated, the Protestants sustained an irreparable loss in the death of Gustavus Adolphus, who was slain at the moment of victory. Oxenstierna now succeeded to the command of the Swedish army and sustained the advantages gained until 1634, when the Protestants under Bernard of Weimar were defeated at Nördlingen.

The French-Swedish period of the war began in 1636, when Richelieu joined the Protestant forces to defeat the ambitions of Austria. France thus became united with Sweden and Richelieu was given general direction of the war, but the conquest now became political rather than religious, and Denmark and Saxony united with Austria. Northern Germany was held by the Swedes under Banér, who defeated an army of Saxons and Austrians at Wittstock in 1636. Later the same army gained victories at Breitenfeld in 1642 and at Jankau in 1645. Another army under Condé and Turenne gained repeated victories in the regions of the Rhine and forced the opposing army to leave the Palatinate and Bavaria. It was planned to conduct a general invasion of Austria, but the different governments had been endeavoring to bring the war to a close, which was finally accomplished in 1648 by the Treaty of Westphalia. Protestantism was saved by the most terrible war of modern times, but at a cost that is astounding. Many provinces of Germany were devastated and the population was greatly decreased. From the effect of this contest Germany recovered only after a period of two centuries. See Reformation.

THISTLE (this"l), an extensive genus of plants of the aster family. Some of these plants are troublesome weeds in many sections of Canada and the United States, where about thirty species have been described. They have prickly leaves and tubular flowers in a hairy receptacle. A tuft of hairs surmounts the seeds. Some species bear beautiful flowers, but the plants are looked upon as obnoxious, owing to their roots being too deeply seated to be plowed

up, and because small particles broken from the parent stalk grow and produce new plants. The Canadian thistle is one of the most troublesome. It appears early in the spring, growing from the perennial rootstock, but the growth is most rapid in midsummer. Many states and provinces have enacted laws requiring owners of land to uproot and destroy it. The Scotch thistle, pasture thistle, milk thistle, carline thistle, and cotton thistle are other species that are widely distributed.

The thistle was adopted as the national emblem of Scotland in the reign of James III.



SCOTCH THISTLE.

CANADIAN THISTLE.

Coins of that country formerly bore the Latin motto, Nemo me impune lacessit, meaning no one touches me with impunity. James VII. of Scotland instituted the Order of the Thistle in 1687. It fell into abeyance during the reign of William and Mary, but was revived in 1703 by Queen Anne and is now one of the recognized orders of Great Britain.

THISTLE, Order of the. See Thistle.

THOMA (to'ma), Hans, painter and illustrator, born at Bernau, Germany, in 1839. He studied art at the Karlsruhe Academy and subsequently pursued courses at Düsseldorf and Paris. Afterward he spent four years in Munich and later went to Italy. In 1899 he became principal of the academy and gallery at Karlsruhe. Besides producing many portraits and landscape paintings, he treated religious and allegorical subjects and did considerable work in illustrating and lithographing. His productions show great originality and power of imagination, and his lithographs are especially valuable for their decorative effect. Among his chief paintings are "An Open Valley," "The Keeper of the Garden of Love," "Landscape with Children," and "A Taunus Landscape."

THOMAS, George Henry, soldier, born in Southampton County, Virginia, July 31, 1816; died in San Francisco, Cal., March 28, 1870. After graduating from the West Point Military

Academy, in 1840, he was commissioned lieutenant and sent against the Seminole Indians in Florida. Subsequently he served in California and Texas, and in the Mexican War gained distinction in the battles of Monterey and Buena Vista. He remained in the southwest until 1849, when he went to Florida for two years' service, and in 1851 became instructor of artillery and cavalry in West Point. At the beginning of the Civil War he was assigned to a division in the army of the Ohio, but soon after was transferred to the army of the Cumberland, with which he fought with distinction in Alabama, Kentucky, and Tennessee. In 1862 he took part in the Shiloh campaign and in the Battle of Stone River, and the following year became brigadier general with command of the army of the Cumberland.

Thomas had the leading part in the Battle of Chickamauga, and for his gallantry became known as the "Rock of Chickamauga." While commanding in the army of the Cumberland, he rendered efficient service in Sherman's march to the sea, and at Nashville defeated the Confederates under Hood in 1864. This battle contributed largely to hastening the end of the war. His services were rewarded by promotion to the rank of major general and by a gold medal on the first anniversary of the battle, presented by the State of Tennessee. He had charge of the military district of Tennessee until 1867, when he was assigned to the third military district, and in 1869 was transferred to the district of the Pacific, his headquarters being in San Francisco. A promotion to the rank of lieutenant general was tendered him in 1868, but he declined. He was buried with the honors of his rank at Troy, N. Y. At Washington, D. C., is a fine equestrian statue in bronze, erected to his honor by the soldiers of

THOMAS, Joseph, lexicographer, born in Cayuga County, New York, Sept. 23, 1811; died in Philadelphia, Dec. 24, 1891. After studying at the Rensselaer Polytechnic Institute and Yale University, he took a medical course in Philadelphia, and spent three years in India and Egypt studying Oriental languages. On returning to America, he became professor of Greek and Latin at Haverford College, Pennsylvania, and in the meantime produced a num-ber of important writings. The best known of his works include "Universal Pronouncing Dictionary of Biography and Mythology,"
"Travels in Egypt and Palestine," and "Comprehensive Medical Dictionary." His brother, John J. Thomas (1810-1895), was an eminent writer on agriculture. He became an editorial writer on the Genesee Farmer, in 1834, and afterward on the Country Gentleman and on the Albany Cultivator. He published "Farm Implements and the Principles of Their Construction and Use" and "Fruit Culturist." He edited the Annual Register of Rural Affairs.

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THOMAS, Lorenzo, soldier, born at Newcastle, Del., Oct. 26, 1804; died March 2, 1875. He graduated at the United States Military Academy, West Point, in 1823, and served against the Indians in Florida. During the Mexican War he was chief of staff to William O. Butler and in 1852 became lieutenant colonel. In 1861 he was promoted to the rank of a colonel and placed in charge of the adjutant general's office at Washington, but the same year became brigadier general in the army. During the latter part of the war he had charge of organization work among colored troops. President Johnson appointed him Secretary of War in 1868, but Secretary Stanton refused to vacate, hence he did not enter upon the duties of the office. He was retired from active service in 1869.

THOMAS, Saint, one of the twelve disciples of Christ. His name is associated with the list of apostles by Matthew and other writers, and he is represented as possessing great devotion for his Master, but he refused to believe in the resurrection of Christ until he came in personal contact with Jesus, hence he is called Tradition makes him the Doubting Thomas. evangelist of Parthia and Edessa. The Christians of Saint Thomas constitute a religious sect in southern India, claiming Saint Thomas their founder. A colony of this sect was conducted by a certain Thomas of Jerusalem to the Malabar coast in 345 A. D., where his adherents have since lived and increased in

THOMAS, Theodore, musical conductor, born at Esens, Germany, Oct. 11, 1835; died Jan. 4, 1905. He received early instruction from his father, who in 1845 removed with his family to the United States. His first appearance in public was at the early age of six years. After coming to America, he played violin solos at New York concerts for two years and subsequently traveled in the Southern States. In 1851 he returned to New York to play as a principal violinist at concerts and operas, but in 1861 became an orchestra leader. He was made director of the College of Music at Cincinnati in 1878, but resigned two years later to become conductor of the New York Philharmonic Society, and in 1891 established his orchestra at the Chicago Auditorium. He was musical director at the World's Columbian Exposition in 1893. His musical concerts given in various cities were popular and he probably did more to raise the standard of music in America than any other person.

THOMAS à KEMPIS. See Kempis.

THOMASVILLE (tom'as-vil), a city in Georgia, county seat of Thomas County, 200 miles southwest of Savannah, on the Atlantic Coast Line and other railroads. The surrounding country is fertile, producing large quantities of cotton, sugar cane, cereals, and fruits. The teatures include the public library, the Young

Female College, the South Georgia Agricultura and Mechanical College, and many schools and churches. It is noted as a summer and health resort. Among the manufactures are flour, fertilizers, cotton-seed oil, furniture, hardware, cigars, and farming implements. It has a growing trade in cereals and merchandise. Popula-

tion, 1900, 5,322; in 1910, 6,727.

THOMPSON (tomp'sun), David, explorer, born in Westminster, England, April 30, 1770; died Feb. 16, 1857. He studied in London and at Oxford and emigrated to Canada in 1789. For some time he was in the service of the Hudson Bay Company. In 1798 he discovered Turtle Lake, which he claimed to be the source of the Mississippi, and later aided in surveying the south shore of Lake Superior. He crossed the Rocky Mountains through a defile, now known as the House Pass, in 1817, and four years later ascended the Columbia River from the junction of the Canoe to its source. In 1832 he surveyed the northern shore of Lake Superior and two years later surveyed Lake Francis. Subsequently he made a survey of Lake Saint Peter and surveyed a route from Lake Huron to the Ottawa River. His services to the government as an explorer were of great value.

THOMPSON, Denman, actor, born at Girard, Pa., Oct. 15, 1832. His boyhood was passed in Swanzey, N. H., where he came in contact with the rustic types that made him famous. In 1852 he made his début as an actor at Lowell, Mass. His successes are based largely upon his success in the comedy entitled "Joshua Whitcomb," which was afterward remodeled as "The Old Homestead." This play was presented four seasons successively in New York City, and was equally popular in the leading cities of America. He died April 14, 1911.

THOMPSON, George, abolitionist, born in Liverpool, England, in 1804; died in 1878. He began to advocate the abolition of slavery in 1833, when he published a number of pamphlets and delivered many lectures. His active work caused the abolition of the system of apprenticeship and was influential in obtaining the freedom of the slaves. In this work he was associated with Garrison and other abolitionists in the United States, in which country he traveled and organized many antislavery societies. From 1847 until 1852 he was a member of Parliament. He is a prominent figure in opposing the Corn Laws and in promoting better government for the people of India.

THOMPSON, James Maurice, author, born in Fairfield, Ind., Sept. 9, 1844; died Feb. 15, 1901. His early life was spent in the mountains of Georgia, half way between Chattanooga and Atlanta, where his father removed and became an extensive planter. He was educated under private tutors and in the public schools. In 1862 he entered the Confederate army, rendering efficient service as a scout until the war terminated with the surrender of General Lee. Soon after the close of the war he went to Indiana as civil engineer on a railroad and while engaged at that work met Alice Lee, whom he married, and settled at Crawfordsville. Subsequently he



JAMES MAURICE THOMPSON.

entered upon a successful law practice and in 1879 was elected to the State Legislature. He was State geologist from 1885 to 1889.

Thompson was self-educated and a writer of much success, both in prose and poetry. He was a scholar of Latin and Greek and knew the literature of France like a Frenchman. He was a genial companion, a fine conversationalist and a bril-

liant writer. In 1867 he explored Lake Okeechobee, Florida, listing its birds, plants, and animals. It may be said that he was ever a lover of nature, a genius of many parts. His writings began in 1873, when he published his poem "At the Window" in the Atlantic Monthly. His other writings include "Hoosier Mosaics," "Bird Notes," "Witchery of Archery," "Boys' Book of Sports," "Songs of Fair Weather," "Sylvan Secrets," "Story of Louisiana," "Ethics in Literary Art," "A Fortnight of Folly," "Lincoln's Grave," "Alice of Old Vincennes," "Byways and Bird Notes," "King of Honey Island," "A Tallahassee Girl," and "At Love's Extreme."

THOMPSON, Joseph Parrish, clergyman and author, born in Philadelphia, Pa., Aug. 7, 1819; died in Berlin, Germany, Sept. 20, 1879. After graduating from Yale University and Andover Theological Seminary, he became pastor of a Congregational church in New Haven, but soon after began a long and successful pastorate in the Broadway Tabernacle Church, New York. His early writings were for the Brooklyn Independent and later he became a contributor to the North American Review. He traveled in Egypt, Arabia, Palestine, and other Oriental countries from 1852 to 1853. In 1872 he became a resident of Berlin, Germany, where he resided until his death. His writings include "Man in Genesis and Geology," "Lectures to Young Men," "Church and State in the United States,"
"Egypt, Past and Present," "Christianity and Emancipation," "The Workman," "Theology of Christ, in His Own Words," and "Christian Graces."

THOMPSON, Launt, sculptor, born in Abbeyleix, Ireland, Feb. 8, 1833; died Sept. 26, 1894. He came to the United States at an early age and studied anatomy in Albany, N. Y., but had the advantage of a course in a medical college. Subsequently he took up the study of sculpture under Erastus D. Palmer, with whom he worked nine years. In 1858 he removed to New York, where he became an associate of the Academy of Design the following year. He studied in Italy in 1868 and in 1875. The

works of Thompson are celebrated for remarkable grace and beauty, and his talent for portraiture is especially noted. Yale University conferred the degree of master of arts on him in 1874. Among his productions are a portrait bust of William C. Bryant, in the Metropolitan Museum of Art, New York; a statue of Winfield Scott, at the Soldiers' Home, Washington; and a soldiers' monument at Pittsfield, Mass. Other works of note include statues of Napoleon I., Abraham Pierson, and John Sedgwick. His bust known as "Elaine" and his medallion entitled "Morning Glory" are works of beauty.

entitled "Morning Glory" are works of beauty. THOMPSON, Richard Wigginton, statesman, born in Culpeper County, Virginia, June 9, 1809; died Feb. 9, 1900. He attended the public schools in his native county, removed to Kentucky in 1831, and afterward settled in Indiana, where he was admitted to the bar in 1834. In the same year he became a member of the State Legislature and in 1836 was elected to the State senate. He served in Congress from 1841 to 1843 and again from 1847 to 1849 and was a presidential elector on the Republican ticket in 1864. In 1867 he became a circuit judge in his State, serving until 1869, and in 1877 entered the Cabinet of President Hayes as Secretary of the Navy. He resigned that position in 1881 to become chairman of the American committee of the Panama Canal Company, and soon after became a director in the Panama Railroad Company. He took high rank as a clear and forcible speaker and is the author of several important works, including "History of the Tariff" and "Papacy and Civil Power.'

THOMPSON, Robert Ellis, educator, born near Largan, Ireland, April 5, 1844. In 1857 he came to the United States and settled in Philadelphia, where he attended school. He graduated at the University of Pennsylvania in 1865 and was ordained minister by the Reformed Presbyterian Church in 1868, when he became professor of Latin and mathematics in the University of Pennsylvania. He was elected principal of the Philadelphia high school in 1894. From 1870 to 1881 he was editor of the Pennsylvania Monthly, and subsequently edited the American Weekly. Besides contributing to a number of encyclopedias, he published "Social Science and National Economy," "Divine Order of Human Society," "Political Economy for High Schools," "Protection to Home Industry," and "History of the Presbyterian Church of America."

THOMSON, Elihu, American electrician, born in Manchester, England, March 29, 1853. He came to the United States in 1858 and studied electricity in Philadelphia, where he afterward taught chemistry in the high school. Subsequently he engaged as practical electrician in Connecticut and became the patentee of valuable apparatus for use in motor work, incandescent lighting, induction systems, and nu-

merous other purposes. He organized the Thomson-Houston Electric Company, with headquarters at Lynn, Mass., and was president of the American Institute of Electrical Engineers for some time. Several hundred patents were issued to him. He is the author of valuable treatises on the use and application of electricity.

THOMSON, James, poet, born in Roxburghshire, Scotland, Sept. 11, 1700; died near Richmond, England, Aug. 27, 1748. His father was a minister in the parish of Ednam, where he received his first instruction, and afterward studied at the University of Edinburgh. In 1725 he went to London, where he obtained a tutorship in the family of Lord Binning, but soon gave up teaching to engage in literature. His first poem of a series called "The Seasons" appeared in 1730. It was known as "Winter" and subsequently he published "Summer," "Spring," and "Autumn." "The Seasons" forms the basis for his literary reputation. It is written in an original style, gives a minute description of the phenomena of nature, and has been much read by foreigners. In 1740 he published, in conjunction with Mallet (1705-1765), "The Masque of Alfred," which contains the song, "Rule Britannia." "Tancred and Sigismunda" appeared in 1845 and "Castle of Indolence" was his last work. Other writings from his pen include "Edward and Elenora," "Agamemnon," "Sophonisba," "Liberty," and "Ode to the Memory of Sir Isaac Newton."

THOMSON, Sir William (Lord Kelvin), physicist and mathematician, born in Belfast, Ireland, June 25, 1824; died Dec. 17, 1907. He



WILLIAM THOMSON.

was the son of James Thomson. lecturer mathematics in Glasgow University, where he finished a unicourse. versity but afterward studied at Cambridge, graduating from the latter in 1845. In 1846 he became professor

of natural philosophy at Glasgow University, serving in that capacity until 1896, when he retired, after holding the chair half a century. His first writings of extensive scope appeared in the Cambridge and Dublin Mathematical Journal, of which he was editor for many years. His treatise on "The Distribution of Electricity on Spherical Conductors" appeared in 1845, and his celebrated lecture on "Electrodynamic Properties of Metals" was published in 1885.

Sir William Thomson is best known for his eminent services in connection with the

Atlantic cable and on its successful completion, in 1866, he was knighted and accorded other honors. Subsequently he aided in planning several minor submarine cables, invented valuable apparatus for taking deep-sea soundings with a steel pianoforte wire, and made important additions to our knowledge of heat, magnetism, and gases. He was made a baron in the peerage of the United Kingdom in 1894, and during his long and eventful career held many positions of honor in scientific associations, among them the presidency of the British Association in 1871. His publications include "Geology and General Physics," "Popular Lectures and Addresses," "Constitution of Matter," and "Navigatorial Affairs." He joined Professor Tait, of Edinburgh, in publishing a treatise on "Natural Philosophy."

THOR (thôr), in Scandinavian legends, the god of thunder and the ruler of the winds and the seasons. He is represented as the son of Odin and Frigga. It is reputed that he had his home in a palace called Thrudwanger, where he received the gallant warriors that had fallen in battle. Thunder was caused by the noise of his chariot wheels, which vehicle was drawn by he-goats. The thunderbolts were hurled at the monsters and giants, but the family and agriculture were carefully protected by him. He bore a hammer as an ensign, which, after being hurled at his victims, always returned to his hand. A belt of magic impulses worn about his waist continuously renewed his strength for battle, thus making him ever active and powerful. Thor is spoken of in the Eddas as the champion of men and gods, and Thorsday, or Thursday, the fifth day of the week, is named for him.

THORACIC DUCT (thô-răs'îk), the largest lymphatic vessel of the human body. It extends from the receptaculum chyli, the vessel in which the contents of the lacteals are collected, to the junction of the left internal jugular and the left subclavian veins, passing upward on the left side of the spinal column. This duct is from eighteen to twenty inches long, is about one-eighth of an inch in diameter, and has numerous valves opening toward the neck. Most of the lymph of the body and chyle is discharged by the thoracic duct into the left subclavian veins. The contents pass upward, but cannot pass downward owing to the valves within, and at the outlet are valves that prevent the entrance of blood.

THOREAU (tho'ro), Henry David, naturalist and author, born in Concord, Mass., July 12, 1817; died May 6, 1862. He graduated from Harvard University, in 1837, and soon after entered upon a brief career as school teacher. Neither happy nor successful in that profession, he became a surveyor, and afterward tried to attain success by engaging in trade. He soon withdrew from the demands and restrictions of society to develop his talents in seclusion, and for that purpose built a hut on the pine slope near the shores of Walden Pond, where he spent his time studying nature and his books. His early writings were contributed to a number of papers, and his first published work ap-

peared in 1845, entitled "Walden, or Life in the Woods."

Thoreau lived in his hut on Walden Pond for two years, spending his time in such frugality that his expenses were only \$35 a year, or about ten cents a day. It was said of him that he never voted, paid no taxes, ate no flesh, never attended church, never married,



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HENRY D. THOREAU.

never used tobacco or liquor, and was happiest when scrutinizing nature and literature. After leaving Walden Pond, in 1847, he engaged as pencil maker in Concord. His writings have been published in seven uniform volumes, including "A Week on the Concord and Merrimac Rivers," "Walden, or Life in the Woods," "Excursions in the Field and Forest," "Maine Woods," "Cape Cod," "Letters to Various Persons," and "A Yankee in Canada." The writings of Thoreau are remarkable for the exactness with which he details landscapes, objects, and persons. He contributed to Putnam's Magazine, the Atlantic Monthly, The Dial, and the Tribune.

THORIUM (thō'rī-um), a rare metal discovered by Brezelius in 1828, so named from the Scandinavian god Thor. It is a grayish metallic powder, burns with a bright flame, and with oxygen forms a white dioxide called thoria. Thorium is found in Norway and North Carolina, where it occurs in thorite, orangite, and other rare metals. It is used for minor commercial purposes and in making the mantle for the Welsbach gas burner.

THORN, a city of Germany, in the province of West Prussia, 86 miles northeast of Posen. It is divided into two nearly equal parts by the Vistula River. The place was founded in 1812 and became important as a member of the Hanseatic League. In 1454 it was annexed to Poland, but it has been a part of Prussia since 1793. Population, 1915, 31,801.

THORNDIKE, Edward Lee, psychologist, born at Williamsburg, Mass., Aug. 31, 1874. He studied at Wesleyan, Harvard, and Columbia universities, and in 1898 became an instructor in genetic psychology at Western Reserve University. In 1904 he was made professor of genetic psychology at Columbia University. He has published several books on psychology.

THORWALDSEN (tôr'wald-sĕn), Albert Bertel, eminent sculptor, born in Copenhagen, Denmark, Nov. 19, 1770; died there March 24, 1844. He was a son of Gottschalk Thorwaldsen, a native of Iceland who had settled in Copenhagen, where he pursued the trade of a wood carver. After working with his father and studying at home, he secured admission to the Academy of Copenhagen in 1793, in which he

gained a prize that enabled him to travel abroad and study art for three years. In 1797 he went to Rome, where he met Canova, who highly praised his model for a statue of Jason. gentleman then traveling in Italy supplied the nec-



ALBERT BERTEL THORWALDSEN.

essary money to execute a copy of it in marble, and from that time his success and fame were assured. He returned to Denmark in 1819, after having spent about 23 years in Italy. He was tendered a magnificent reception in Copenhagen, and an apartment in the palace of Charlottenburg was assigned to him. A year later he returned to Rome, where he labored continuously up to 1838, when he went back to Denmark with the view of remaining there permanently, but the climate made it necessary to leave for Italy in 1841. He revisited Copenhagen in 1844 and died shortly after reaching the city.

Thorwaldsen ranks as one of the greatest of modern sculptors, his productions being famed the world over, and is regarded by many the most skilled since Michael Angelo. His productions are very numerous and are concerned largely with classical and mythological subjects, though they include a number of historical and biblical characters. He bequeathed his possessions to his country, which are preserved in the Thorwaldsen Museum at Copenhagen, and gave a large portion of his fortune to his native city. Among his most celebrated productions are "Christ and the Twelve Apostles," "Procession to Golgotha," and "Saint John Preaching in the Wilderness," these three being in the cathedral of Copenhagen. Others include a bust of Byron, the bas-reliefs of Night and Morning, the figure of "Christ the Comforter," and a monument near Lucerne, Switzerland. Fine productions executed by Thorwaldsen may be seen in many places of Germany, Austria, Italy, and other European countries. About 300 of his works are in the Thorwaldsen Museum. Hans Peter Holst (1811-1893), a Danish poet and novelist, published 120 lithographs of the works of Thorwaldsen in his "Musee Thorwaldsen."

THOTHMES (thoth'mez), the name of four kings of Egypt, classed as the fourth, fifth, sixth, and eighth of the eighteenth dynasty. The first of these kings ascended the throne about

1560 B. c. and, according to Manetho, reigned for 22 years. Thothmes III. is the most famous of this line of kings. He became the ruler of Egypt about 1538 B. c. and held the throne nearly 54 years. Hatasu, his aunt, ruled conjointly with him about one-third of this period, but he became sole ruler about 1516 and entered upon a career of conquest. With a large army he invaded Syria, defeating the allied Syrian forces on the plain of Esdraleon, and subsequently conquered a large part of the region lying between the Euphrates and the Mediterranean. It appears he enlarged the Temple of Karnak, whose walls he inscribed with accounts of his deeds. He added to the splendor of Thebes and other cities along the Nile, from the delta to the second cataract, and erected numerous temples and obelisks. Among the famous obelisks constructed during his reign are those on Lateran Hill, in Rome; on the Thames Embankment, in London; and in Central Park, New York City.

THOUGHT, the power of the mind to form and rationally apply general conceptions. It involves the mental processes of comparing, judging, and reasoning. The function of apperception is primarily involved, but afterward it works upon the more abstract material used in arguments and reasonings. The lower exercises of mind are classed as perception, and in nature thought does not differ from the effort involved in that process, even in the higher processes of general conception. The latter do not include general concepts, such as represent classes of material objects, but inductions and all other mental products which are formed by generalization. See Apperception; Conception; Rea-

THOUSAND ISLANDS, the name applied to a group of islands in the Saint Lawrence River, near the outlet of Lake Ontario. The river has an expansion at this place from four to seven miles wide and forty miles long, within which are about 1,750 small islands. Many of them have beautiful scenery and are visited by tourists during the summer. Thousand Island Park is one of the chief attractions. Alexander Bay, located within the park, is popular as a summer resort. The islands have a varied line of scenery, including precipitous rocks and beautiful groves. Many wealthy Canadians and Americans have summer homes in these islands.

soning.

THRACE (thrās), an ancient country of Europe, whose main boundary on the north was formed by the Danube, east by the Black Sea, south by the Aegean Sea and Macedonia, and west by Macedonia and Illyria. It coincided more or less closely with the region now included in Bulgaria, Eastern Rumelia, and central European Turkey. The region is more or less mountainous and is divided into two parts by the Haemus Mountains (Balkans), the northern part forming Moesia and the southern part Thrace. Large forests of chestnut, fir, oak, and

other classes of valuable woods were abundant. Marshy swamps extended along the coast and in many valleys. The Greeks occupied the region along the coasts, though their settlements extended to the interior highlands, where productive mines were worked with success. Much of the soil possessed remarkable fertility, yielding large quantities of wheat, millet, hemp, and fruits, while horses, cattle, sheep, swine, and poultry were reared in large numbers.

The Thracian horsemen rivaled those of Thessaly and played a prominent part in the military affairs of Greece. Philip of Macedon was attracted by the production of gold and silver and in 359 B. C. conquered most of Thrace. It became a Roman possession in 168 B. C., being annexed along with the territory of the Macedonian kingdom. After the decline of Rome it was overrun by Alaric and Attila, and in 1353 was taken as a Turkish possession by Amurath, but since then Bulgaria and Eastern Rumelia have been separated from it. The most noteworthy places of ancient Thrace include Sestos on the Hellespont; Abdera, the birthplace of Protagoras and Democritus; and Byzantium, the ancient name of Constantinople.

THRASHER (thrash'er), the common name of a class of birds which resemble the thrush. In most species the bill is long and somewhat curved, the wings are short, and the general color is ash or brown above. The brown thrasher, sometimes called the brown thrush, is the best known of these birds. It has a pleasing song and may be heard both in the morning and in the evening. This bird is migratory, passing from the southern part of Canada to the vicinity of the Gulf of Mexico. Other species include the gray curvebill thrasher, the Arizona thrasher, and the California thrasher.

THREAD, a small twine or cord made by doubling and twisting several thicknesses of yarn. Thread made of cotton is used very extensively for sewing clothing and other manufactures. It is made from the fibers of the best grade of cotton, usually the sea island cotton. and the process of manufacture is largely by machinery. The cotton fibers are first picked and passed through the carding machine, after which they are fed into the drawing frame. A series of rollers in the drawing frame causes the carded cotton to be drawn out into ribbonlike forms, this being effected by each succeeding set of rollers moving faster than the preceding. It is then taken to the doubling frame and compressed to form a delicate strip, and these strips are again carded, after which they are wound upon a bobbin. The finished product is obtained by twisting six of the strips into a cord or thread, but to obtain the proper size it is necessary to reduce them by spinning them several times successfully. Thread sold on the market is either white or colored. White thread is obtained by bleaching after the spinning has been completed, while the colored varieties are obtained by dyeing, after which the product is wound upon wooden spools. Several kinds of thread are made of linen and silk.

THREADWORM, the name of several worms classed with the entozoa, so called from the slender threadlike body. Several species have been described. They are parasites in human beings and are especially annoying in children. The common threadworm is four to six inches long, is one-tenth of an inch in diameter, and has a hard and muscular body. Some worms of this kind attain a length of three feet, while others are quite small. Species closely allied with those found in man occur in the brain cavity of birds.

THREE RIVERS, a town of Saint Joseph

THREE RIVERS, a town of Saint Joseph County, Michigan, 25 miles south of Kalamazoo. It is surrounded by a fertile farming and fruit-growing region, giving it a growing trade in produce and merchandise. It has extensive railroad facilities and is provided with good schools, numerous churches, and modern municipal improvements. Among the manufactures are flour, lumber products, paper, chemicals, and farming

implements. Population, 1910, 5,072.

THREE RIVERS, a city of Quebec, capital of Saint Maurice County, 75 miles southwest of Quebec. It is at the confluence of the Saint Maurice and the Saint Lawrence rivers, on the Canadian Pacific and the Grand Trunk railways, and is important as a port of entry. Near it are the famous falls of Shawanegan. The principal buildings include the county courthouse, the Protestant College, the Ursuline Convent, the high school, the Dominion Hotel, the public library, and a bishop's palace. It has manufactures of lumber products, boots and shoes, machinery, and clothing. The public utilities include sewerage, electric lighting, and waterworks. It was founded by Champlain in 1634, hence is one of the oldest towns in Canada. Population, 1918, 15,430.

THRESHING MACHINE, an important machine of modern construction, used to separate the grain from the chaff and straw. In primitive threshing the grain was beaten out of the straw by blows with the flail, which was swung by the workman. It consists of two pieces of wood fastened together by stout thongs, one of which is held in the hands of the workman, while the other swings loosely and is caused to strike the heads of the grain spread upon the ground or the barn floor. Anciently the Egyptians and Israelities threshed the grain by spreading the loosened sheaves upon a circular piece of ground and having it tread upon by oxen. The oxen were driven in the circle formed by the sheaves of grain, and in some cases were hitched to the threshing sledge, which was rolled over the sheaves. This process was continued until the grain was well shelled out of the ears, when the straw was carefully removed by hand and the remaining grain and chaff were gathered and fanned, thereby separating the grain from

the impurities. While the sledge has gone out of use, the flail is still employed to some extent, even in America and Europe, especially to thresh beans and peas.

The modern threshing machine may be said to date from 1786, when Andrew Meikle, a mechanic of Scotland, constructed a thresher that contained the principal parts of a modern machine. It utilized the rotary beater, or flail type, as seen in the beater, or drum, of the modern types. This beater contains iron teeth held in place by burs, and similar teeth are in the concave. The teeth of both parts are so fitted that those of the beater pass closely by those of the concave as the beater revolves rapidly. Sheaves of grain are loosened and fed with the ears toward the machine, and the straws are taken up as the beater revolves, though sheaves must be fed regularly so as not to permit the machine to run empty. Immediately back of the beater is a revolving drum, or apron, which carries the grain and straw. Rakes and beaters strike downward upon the straw to separate from it the loosened grain, and the latter is secured by a shaker and carried to the blowing drum and then to the winnowing apparatus, where the chaff is blown out by a fanning mill as it passes upon screens, through which the grains fall. In the modern machines there are screens of different sizes fitted for various kinds of grain, such as wheat, oats, barley, rye, timothy, spelt, etc., and a second set of screens causes small seeds of weeds to be separated from the grain. The straw is carried by a stacker, or is blown from the machine by a set of fans that revolve rapidly. In most modern machines the apron is entirely dispensed with and the agitator, or vibrator, models are used instead.

It requires ten horses to furnish sufficient power for a threshing machine. The power is transmitted by a belt or a tumbling rod from the machine known as the horse power to the separator. However, horses have been displaced largely by traction engines with a capacity of twelve to fifteen horse power. A modern machine will thresh from 800 to 1,500 bushels of grain per day. Machines of special construction are used for threshing peanuts, peas, rice, beans, and clover. Coal is used chiefly as fuel, and the smokestack is screened as a protection against fire. In sections of country where fuel is scarce or expensive, the straw-burning furnace is used to some extent.

THRESHER SHARK, or Fox Shark, a species of shark found in the warm seas. The tail is peculiarly long and is used in aiding to obtain food. This shark usually rushes into a school of gregarious fishes and kills or stuns many by threshing about with the tail. The larger specimens are about fifteen feet long and are whitish beneath and gray-bluish above. These fish are found in the Mediterranean and the Atlantic. They are not valuable as a commercial fish.

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THRIPS (thrips), the name of a genus of minute insects. The body is slender and has four wings, but they appear to leap rather than fly. About thirty American species have been described and they bear a close resemblance to the plant lice. These insects attack the flowers and leaves of plants, but some species feed upon other insects. Some are injurious to tobacco, while others damage onions and timothy grass.

THRUSH, a genus of birds common to all the continents and most of the islands. They embrace a great variety of species. Some are



BROWN THRUSH.

gregarious, others live solitarily or in pairs, and some are migratory. The wood thrush is one of the most widely distributed species of North America, ranging from Guatemala to Southwestern Canada. It migrates southward in the fall, usually to the Carolinas and beyond. The length is eight inches, with an alar extent of about fourteen inches. It is quite shy, usually preferring its native woods, and the song is clear and beautiful. The brown thrush, or thrasher, is another widely distributed bird and its song is the most beautiful of the American thrushes. It is reddish-brown above and yellowish-white below, and somewhat resembles the mocking bird. The hermit thrush is an American bird of solitary habits. The best known of the European species is the song thrush, a bird of beautiful song. Its plumage is brown and yellowish, with numerous spots of dark brown. It inhabits all parts of Europe, but moves southward on the approach of winter. Both male and female are attentive to their young, usually four to six in number. The body of a full-grown song thrush of this kind is nine inches long. Its song is very beautiful and it may be taught simple airs in captivity. Other species include the West Indian thrush. The common robin belongs to the thrush family

THRUSH, or Sprue, a disease common to infants, but sometimes seen in adults. It attacks the lining membrane of the mouth and throat, the angles of the lips, and the surface of the tongue. In most cases the affected parts are characterized by whitish specks. These small specks or patches develop into ulcers, causing a painful rawness of the affected parts. In some cases the affection is rather a symptom than a

disease, and requires the attention of a physician. Cleanliness is especially important.

THUCYDIDES (thû-sid'i-dez), eminent historian, born in Athens, Greece, about 471; died about 400 B.C. He was a son of Olorus,

and studied oratory under Antiphon and philosophy under Anaxagoras. His family owning gold mines in Thrace and being wealthy, he was privileged to secure a liberal education, and rose rapidly as a prominent influence in society and in public affairs. The history read by Herodotus at Olympia had such an impressive influence upon him that he modeled largely after that writer, but greatly ex-



THUCYDIDES.

celled him in style. In 424 B. c. he was given command of an Athenian squadron at Thasus, but, being charged with carelessness in performing his duty in the Peloponnesian War, he was exiled for twenty years. It is thought that the period of his exile was spent in several towns of the Peloponnesus, but this is not certain. His writings include eight books of history, but the last of the series does not contain political speeches, a striking feature of the first seven books, hence has been assigned to other writers. These historical writings treat of the Peloponnesian War, which covered the period of 29 years between 431 and 402 B. C., but they extend only to the year 411 B.C. It is not certain whether Thucydides died at that time or whether the latter part of the history, if completed, was destroyed. As a writer he was painstaking, closely analyzed character and action, and treated the subject-matter with remarkable accuracy. Meaning is condensed in his writings, and the style is not only beautiful but interesting. Many translations into modern languages have been made from his works by various writers.

THUGS (thugz), a class of religious thinkers formerly numerous in India, so called from a Sanskrit word meaning a cheat. The members of this sect formed a secret society made up of gangs numbering from 10 to 200. They were banded together and traveled under various disguises with the view of attaining the confidence of the wealthier travelers and traders, and at a favorable opportunity strangled and robbed them. The practice is known as thuggee and was first mentioned by travelers in India in 1356. Each band was accompanied by officers specially assigned to them, such as leaders, teachers, spies, stranglers, gravediggers, and guards. They infested the mountain regions and river valleys, and usually came out to the towns and populated districts to secure the confidence of those designed to be murdered and robbed. This system of lawlessness was practiced from religious motives, being considered acceptable to their goddess, Kali. Rigid measures were taken against the Thugs by Lord William Bentinck in 1829. In the period between 1830 and 1835 fully 2,000 arrests were made, and of these 1,500 were convicted and sentenced to death or imprisoned. The law of 1830 made membership in a gang of Thugs punishable by imprisonment for life at hard labor. This rigid course practically exterminated the once powerful order, though some gangs still linger in remote regions.

THULE (thū'le), the name given by the ancient Greeks to the most northerly portion of Europe known to them. It is thought to have referred to a part of Norway or the Shetland Island. Later the Romans applied the same name to the northernmost parts of the earth, and in this sense it was used in oratory. Ultima Thule had reference to the most distant unknown land, and the term was used in this sense

by the Romans.

THUMANN (too'man), Paul, painter and illustrator, born in Tschacksdorf, Germany, in 1834. He studied the elementary branches in his native town and subsequently attended the universities of Berlin, Weimar, and Dresden, giving much attention to painting. He was teacher of drawing and painting in an academy at Weimar several years, and subsequently held like positions at Dresden and Berlin. In 1873 he completed a series of paintings that illustrate five scenes from the life of Luther. His "Baptism of Wittekind" and "Return of Arminius from the Teutoburg Forest" are noted mural paintings. He illustrated Heine's "Book of Songs," Goethe's "Poetry and Truth," Hammerling's "Amor and Psyche," and Chamisso's "Women's Love and Life.'

THUN (toon), a lake of Switzerland, in the canton of Bern. It is located about 1,835 feet above sea level and is two miles wide and ten miles long. On the eastern shore is the town of Interlaken and on the northwestern coast is Thun. These places are connected by a railway. The Aar discharges the overflow. Large numbers of tourists visit the vicinity at all times of

the year.

THURLOW (thur'lo), Edward, public man, born in Norfolk, England, in 1731; died Sept. 14, 1806. He studied at Cambridge University, but did not graduate, and was admitted to the bar in 1754. Shortly afterward he entered politics as a Tory, and in 1768 was elected to Parliament. He became Lord Chancellor in 1778 and took his seat in the House of Lords as Baron Thurlow of Ashfield. As a public man he opposed constitutional reforms and favored the slave trade. Through the efforts of Pitt he was dismissed from the office of Lord Chancellor, but was restored for a brief time and was again dismissed in 1783, when he was succeeded in that office by Pitt. Though he has a great reputation

for ability, he is looked upon as a man of overbearing and passionate character.

THURMAN (thûr'man), Allen Granberry, jurist and statesman, born in Lynchburg, Va., Nov. 13, 1813; died at Columbus, Ohio, Dec. 12, 1895. He descended from the family of Joseph Hewes, a signer of the Declaration of Independence. His parents settled at Chillicothe, Ohio, in 1819, where he attended the public schools and the academy. After surveying for some time, he studied law and in 1835 was admitted to the bar. He became a member of Congress in 1844, served as justice of the State supreme court from 1851 to 1854, and was chief justice from 1854 to 1856. In 1867 he was the ursuccessful Democratic candidate for Governor of Ohio, being defeated by Rutherford B. Hayes by fewer than 3,000 votes, but was elected to the United States Senate in 1869, serving in that body until 1881. He was the leader of his party in the Senate, served on a number of important committees, and for some time was its president pro tem. The Thurman Act, which compelled the Pacific railroads to execute their contracts with the government, was one of the important laws formulated by him. President Garfield appointed him a delegate to the Paris monetary convention in 1881. He was mentioned as a candidate for President at various times and in 1888 became the nominee for Vice President with Cleveland, but sustained defeat at the polls.

THURSDAY. See Thor.

THURSTON (thûrs'tŭn), Robert Henry, mechanical engineer, born in Providence, R. I., Oct. 29, 1839; died in 1903. He graduated from Brown University in 1859, and subsequently studied mechanical engineering in the workshop of his father. Soon after the beginning of the Civil War he joined the Union army and served with distinction at Port Royal and Charleston. In 1865 he accepted a professorship in philosophy at the Annapolis Naval Academy, became professor of engineering in Stephens Institute of Technicology in 1876, and held a like position in the Sibley College at Cornell, beginning work there in 1885. Thurston has been fittingly honored by many American and foreign engineering and scientific societies, and was the first president of the American Society of Mechanical Engineers. He served on commissions of the United States government to aid in testing iron and steel, to investigate the cause of boiler explosions, and to report on the construction of safe and bank vaults. His published works are numerous, including "Materials of Engineering," "History and Growth of the Steam Engine," "Manual of the Steam Engine," "Manual of Steam Boilers," "Friction and Lost Work," "Friction and Lubrication," and "Text-Book of the Materials of Construction."

THWAITES, Reuben Gold, historian, born in Dorchester, Mass., May 15, 1853. He received a public school education, did postgraduate work at Yale, and in 1876 became editor of the Wis-

consin State Journal at Madison. In 1886 he became secretary of the Wisconsin State Historical Society. His writings are numerous and give evidence of careful and scholarly research. They include "Down Historic Waterways," "Stories of the Badger State," "The Jesuit Relation," "France in America," and "The Colonies, 1492-1750." He died Jan. 17, 1916.

THYME (tim), an aromatic plant of the mint family. The genus comprises about thirty species, mostly native to the southern part of Europe. The common thyme has an upright stem, about a foot high, and a strong odor. It is cultivated in gardens as an ornamental plant and yields an essential oil used for flavoring. Several species have been naturalized in North America.

TIAN SHAN. See Thian Shan.

TIARA (ti-a'ra), the name of a headdress first used by the reigning family of Persia, but later adopted by the priests and potentates of other countries. Nicholas I., Pope of Rome, adopted the tiara as symbolical of the Pope's temporal authority in 860. The tiara worn by the popes consists of a cap of cloth made of gold. It is encircled by three golden coronets and surmounted by a cross of gold. A fringed and embroidered pendant hangs from either side. This tiara is the crown of the Pope, but in purely spiritual ceremonies that official wears the

miter, like other bishops.

TIBER (tī'ber), in Italian, Tevere, a famous river in Italy, which rises on the southern slope of the Apennines, in Tuscany, and, after a course of 245 miles toward the south, flows into the Mediterranean. The channel forms a zigzag line, especially in the upper part, and there are rapids between Todi and Passo del Forello. It receives the water from the Nera at Orte, to which place it is navigable for boats of light draught, a distance of about 96 miles from the Mediterranean. Three miles above Rome it is joined by the ancient Anio, now the Teverone, and within the city it divides to form the ancient island of Tiberina. Rome is situated fifteen miles from its mouth and is reached by large vessels. Although it enters the sea by a large delta, the main channel is 300 feet wide and 10 to 20 feet deep at the place where it discharges. A number of substantial improvements have been made in the way of embankments, excavations, and canals to facilitate navigation. The valley of the Tiber is a fertile region and is traversed by several railroad lines. Its water is colored yellow by the clay forming the basin through which it flows, hence it is often spoken of as the yellow Tiber.

TIBERIUS (tf-be'rĭ-ŭs), Claudius Nero Caesar, Emperor of Rome, born Nov. 16, 42 B. C.; died March 16, 37 A.D. He was a son of Tiberius Claudius Nero, hence the stepson of Augustus, by whom he was adopted. His education received careful attention, and the retired mode of his life brought him into favor with the emperor and the Roman people. He first

married Vipsania Agrippina, but was forced by the emperor to divorce her in 11 B. c. and marry his daughter Julia. Soon after a command was given him in the army stationed on the German frontier, and on the death of Augustus, in 14 A. D., he ascended the Roman throne. Insurrections broke out soon after in the regions of the Rhine and in Pannonia, but these were soon crushed by Drusus and Germanicus. Tiberius ruled with considerable moderation and liberality in the beginning, but soon developed into a suspicious tyrant. He appears to have been influenced largely by his mother, Livia, and after her death, in 29 A.D., by several others, particularly by Aelius Sejanus, an able commander of the Pretorian guards.

Many of the leading citizens, including his popular nephew, Germanicus, were put to death, largely for fear they might become claimants of the throne. The government was left entirely to Sejanus in 26 A.D., while he retired to the island of Capri to indulge in sensual pleasures. In his absence Sejanus became ambitious to usurp the throne, but Tiberius had him put to death in 31 and chose Marco to manage the government. The last seven years of his life were remarkable for degradation, his vices causing ulcerous sores to appear on his body, and he never again returned to Rome. Caligula succeeded him as emperor, being proclaimed by the people before the death of Tiberius, who was suffocated while in a fainting fit. Christ was crucified at Jerusalem in the reign of Tiberius. He is the author of several Greek poems, an oration on L. Caesar, and a commentary on his political life.

TIBET (ti-bet'), or Thibet, a country of Central Asia, nominally a province of the Chinese Empire, though largely independent in its government and internal relations. It is situated north of the Himalayas, forming the large region between those mountains and the Kuen-Lun on the north, and extending from Cashmere and the Karakorum range to western China. The region has not been explored extensively, but is supposed to have an area of 651,500 square miles and a population of 6,125,000. It consists of a high plateau, which in few places is lower than 10,000 feet, and contains the sources of several of the great rivers of China and India, among them the Brahmaputra, Hoang-ho, Indus, and Yang-tse-Kiang. The surface is generally elevated to heights varying from 12,000 to 15,000 feet, though in some places peaks tower 20,000 feet above the sea, and numerous salt and fresh water lakes prevail at elevations approximating 14,500 feet. Though situated in latitude almost due east of central Italy, the climate is rigid, owing to its vast elevations. The summers are extremely dry and hot, while the winters approximate those of the Frigid zones. The air is deprived of its moisture before reaching the Tibetian plains, thus making the climate arid, especially from October to March, when nearly all forms of vegetation become dry. Some regions are sandy deserts and others contain a rich soil and considerable forests, but the greater part of the country is best adapted to grazing.

The early history of Tibet is wrapped in tradition, and little was known of its people prior to the 5th century of the Christian era, when they became converted to the teachings of Buddhism. China made it tributary in 821. The first authentic accounts of the country were published by Marco Polo in the 13th century. The inhabitants, though mild in character, have maintained a stubborn opposition to foreign travelers and European trade. Several explorations were made inland in the latter part of the 19th century, and from that period dates the information obtainable regarding the people and their industries. Agriculture is the chief occupation in the valleys, but in many sections irrigation is necessary, while the great scope of country lying in the hilly and less fertile regions is utilized for grazing. It has deposits of gold, silver, tin, copper, niter, sulphur, borax, and salt, but development in mining has been slow on account of a scarcity of transportation facilities and a limited supply of fuel. The soil products include cereals and fruits, while the domestic animals embrace mainly cattle, sheep, camels, and horses. The natives engage in the manufacture of carpets, toys, jewelry, fabrics, and utensils. Most of the trade is with China and consists of exchanging native products for tea, idols, incense, chemicals, metals, tobacco, cotton and woolen clothing, and rice. Lhassa is the seat of the civil government and of a number of monasteries and Buddhist The Tibetans speak a language institutions. which is related to the Chinese tongue. have a copious literature, both religious and secular. Lamas or priests, who represent a form of Buddhism, rule the country. Yatung, a town beyond the Sikkim frontier, was opened to foreign trade under a treaty agreed upon in 1894 and is now the residence of several European representatives. Two Chinese represent the government of China at Lhassa.

Great Britain has looked with suspicion upon the movements of Russia in the valley of the headwaters of the Yang-tse-Kiang River, claiming that its safety and progress in the northern section of India demand the freedom of the upper valley from Russian control. On the other hand, the Russians assert that the British are seeking to establish a protectorate over Tibet. In 1904 a British expedition of 1,000 men, under General McDonald and Colonel Younghusband, invaded the country to hold a conference with the view of agreeing upon certain treaty misunderstandings and to prevent further border depredations. When the expedition reached Guru, about half way from the British India border to Lhassa, it was met by a body of Tibetans with the view of preventing an attack upon Lhassa. In the first encounter the Sikh troops were routed with a loss of 300 men, but later reënforcements were sent and the march

to Lhassa was continued. Those who accompanied the expedition described the capital city as an interesting relic of a former civilization. British troops were stationed at the capital until 1908, when they were withdrawn, on the payment of an indemnity.

TIC DOULOUREUX (tik doo-loo-roo'). See Neuralgia.

TICK, a class of parasites that infest the skin of certain vertebrate animals and various plants. They abound in many parts of the world. but chiefly in warm countries. The mouth is in the form of a sucker, which they bury in the skin of animals and suck the blood. Most species are found on different plants, clinging to the outer bark or coating, but watching a favorable opportunity to fasten themselves to animals. They suck the blood with great greed after becoming attached, thereby causing considerable pain and inflammation, and are frequently fastened with such a firm grip that it requires quite an effort to loosen them. In some warm countries, especially in South America, ticks are very numerous and, unless detached, attain the size of a large bean. The dog tick is a familiar species in the United States, frequently attaching itself to dogs, cattle, and even to man. The carapata is native to Brazil, and the tampan is found in South Africa. Some species are aquatic and frequently fasten themselves to tortoises and other reptiles.

TICKNOR (třk'něr), George, historian, born in Boston, Mass., Aug. 1, 1791; died there Jan. 26, 1871. He completed a course of study at Dartmouth College by graduation, in 1807, and, after studying law in the office of a Massachusetts lawyer, was admitted to the bar in 1813. After practicing a year, he abandoned law to engage in literature, and in 1815 entered the University of Göttingen, Germany, for two years' study. Subsequently he made an extended tour through Spain, Portugal, and France with the view of studying life and literature. On returning to America, in 1819, he was made professor of French and Spanish literature in Harvard University. He resigned that position in 1835 to spend three years in Europe, and in 1838 settled at Boston to engage in writing his essays and history. His "History of Spanish Literature" appeared in 1849 and was shortly after translated into German, Spanish, and French. Other works of value from his pen include "Life of Prescott" and essays on Thatcher's "Sermons," Milton's "Paradise Lost," Griscom's "Tour in Europe," and "Mode of Teaching Living Languages." He wrote "Essays on Daniel Webster," "Essays on General Lafayette," and "Remarks on Changes Proposed in Harvard University."

TICONDEROGA (tf-kon-der-o'ga), a village of New York, in Essex County, 98 miles north of Albany, on the Delaware and Hudson and other railroads. It occupies a fine site a short distance north of Lake George, has an

abundance of water power, and is the center of a large trade in graphite, lumber, and merchan-The French built Fort Carillon, later called Fort Ticonderoga, in 1755, as a means to command lakes George and Champlain. In 1758 a British force under General Abercrombie made an attack upon it, but was repulsed with a loss of 2,000 men. The British numbered 15,000 and the French under Montcalm only 3,600. General Amherst appeared before Ticonderoga in 1759, but the French abandoned it with little opposition. On May 10, 1775, Ethan Allen arrived on the shore of Lake Champlain with a small force and surprised and captured the fort without striking a blow. Burgoyne led a British army against Ticonderoga on July 1, 1777, and, after planting a battery on Fort Defiance, compelled the garrison, 3,000 in number, to evacuate. The fort fell into ruins shortly after the war, but traces of its walls still remain. Population, 1905, 2,014; in 1910, 2,475.

TIDES, the periodic rising and falling of the oceans and the waters connected with them, caused by the attraction of the moon and sun. No satisfactory explanation of these movements of oceanic waters was made until Sir Isaac Newton traced their origin to the law of gravitation, which he discovered in 1666. The tides assume the form of a general wave of water, scarcely perceptible on the open sea, but rising to considerable heights in the estuaries of rivers and inlets having precipitous banks. They are observed twice in the course of a lunar day, or in 24 hours 49 minutes of mean solar time, and occur 52 minutes later from day to day than on the day preceding. The rising of the water is called flood tide, and the falling, ebb tide. Flood tides and ebb tides follow each other every six hours. The waters remain stationary for a few minutes, when they reach their highest and lowest points. these points being called, respectively, high water and low water. Gravitation has an equally strong influence upon the land and water, but, since the latter is free to move, it tends to rise under the attraction of the moon and sun as these bodies pass their influence over the surface of the earth as it rotates upon its axis. The water thus drawn by attraction is accumulated in the part of the earth nearest to the moon. That body has an attraction for the bulk of the earth, and, while causing a flood tide on the side of the earth turned toward it, it also causes a flood tide on the opposite side of the earth by pulling it away from the water, although the latter is somewhat less perceptible.

The influence of the moon is not instantaneous, but requires a little time to produce full effect, hence flood tides occur a few hours after the moon is on the meridian of any particular place. While flood tides occur on the two sides, those turned to and from the moon, ebb tides occur in the regions situated halfway between them, owing to the waters being necessarily depressed. The sun being 400 times farther from

the earth than the moon, it has a less marked effect, but it tends to increase or diminish the lunar tides, according to the position of that body in the heavens. When the sun and moon act simultaneously on the same hemisphere of the earth, the tidal wave is higher than usual and is called a spring tide. However, when the sun and moon are 90° apart, each produces a tide on the portion of the earth directly influenced by it, and the lunar tide at that period is called neap tide. Spring tides occur only at new and full moon, and neap tides take place at first and last quarters, the sun being then at quadrature with the moon. When the moon is in perigee, its attraction is stronger, hence the flood tide is higher and the ebb tide is lower than at other times.

The height of tides is very different, owing to the difference in the depth and size of the water and to the modifications of the contour and outline of the coast. On midocean it is hardly noticeable and rises from a few inches to three feet, but, where the moving water comes in contact with a precipitous shore, it frequently piles up many feet in height. This is true especially off the coasts of continents having shelving bays, deep gulfs, or broad river mouths. The difference between ebb and flood neap tide at New York is about three feet, and that of spring tide about five feet, while at Boston the difference is about ten feet. A headland extending into the ocean diminishes the tide, as off Cape Florida, where the average height is only fourteen to twenty inches. Spring tides in the Persian Gulf and China seas sometimes rise 30 to 38 feet; at the mouth of the Severn, 40 to 48 feet; and in the Bay of Fundy, 65 to 90 feet. A strong wind blowing in the direction of the tide tends to greatly increase the depth of the inflowing water. Where the coasts are low, as is the case in many places, the tide waters flow inland several miles. Tides are utilized in commerce, since they enable ships to sail up the mouths of rivers and land in many harbors otherwise too shallow for approach.

TIECK (tek), Ludwig, novelist and poet, born in Berlin, Germany, May 31, 1773; died April 28, 1853. He studied at the universities of Göttingen, Halle, and Erlangen, and in 1794 settled in Berlin to devote himself to literature. His first writings were published in the Ostrich Feather Magazine, but he soon after traveled to enrich his mind, and in the meantime published a number of novels and poems. In 1800 he visited Jena, where he formed the friendship of Brentano, Schlegel, and Novalis. In connection with these eminent men of literature, he organized the so-called Romantic School of Germany. He made an extended tour of Italy in 1805, and in 1817 visited England to gather material for his "Shakespeare." From 1819 to 1840 he resided at Dresden, but in the latter year was invited to Berlin by Friedrich William IV. of Prussia. His writings are very numerous. They

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are characterized by a deep poetic spirit and fine style, and reflect the power of a vivid imagination. Among the most prominent of his works are "Bluebeard," "Two Remarkable Days in Siegmann's Life," "Life and Death of Little Red Ridinghood," "Heart Effusions of an Art-Loving Monk," "Fancies on Art," "Romantic Poems," "Phantasus," "A History Without Adventures," and "Tales." He made an excellent translation of "Don Quixote." His brother, Christian Friedrich Tieck (1776-1851), is noted as a sculptor. He coöperated with Rauch in improving the art of sculpturing.

TIEN-TSIN (tē-ĕn'-tsēn), or Tientsin, a city of China, at the junction of the Huer and Peiho rivers, 70 miles southeast of Peking. The city is reached by small vessels and is the chief railroad center of China. It has undergone remarkable improvement, especially in its buildings and municipal facilities, within the last few Formerly it contained only illy constructed houses of mud and dried brick, but its streets have been macadamized, trees have been planted, and water and drainage systems have been introduced. The streets are lighted by gas and electricity and telephone and telegraph connections are maintained with other centers of trade. These improvements have been carried forward by foreign enterprise, but the native Chinese have entered into the spirit of progress and have given sanction to the newer and better conditions.

Among the principal buildings are an imperial military college, a mint, an imperial university, an arsenal, and a number of schools, churches, temples, and missionary stations. The Chinese Mining Company has its headquarters in the city, its mines being at Tong Shan, about 180 miles to the north. Much of the machinery for the mines was brought from England and Germany. The city has a large export trade in coal, cotton, peas, dates, and wool. Opium, clothing, sugar, and machinery are imported. At present the annual foreign trade is estimated at \$45,500,-000. The allied armies of France and England captured the Taku forts in 1860 and shortly after took possession of Peking. In 1900 the allied armies of Germany, France, Russia, the United States, and England captured the city, the disturbances being caused by the wholesale destruction of missionary interests by the Boxers. Shortly after the allied armies entered Peking. Population, 1918, 1,050,000.

TIERRA DEL FUEGO (té-ĕr'ra del fwå'-gō), meaning land of fire, an island group near the southern extremity of South America, which is separated from the mainland by the Strait of Magellan. The archipelago consists of one large island and numerous small islets, the total area being 32,000 square miles. Tierra del Fuego, the chief island, is 300 miles long and tapers toward the southeast into Cape San Diego. The point farthest south is formed by a small island and is known as Cape Horn. These islands are of

volcanic origin. They have a mountainous surface, their peaks ranging from 4,500 to 5,450 feet above sea level. The line of perpetual snow extends some distance below the summits of the more elevated peaks and vegetation consists principally of stunted forest trees, shrubs, and grasses. These islands have a very cold and disagreeable climate. The inhabitants are Patagonians, who subsist by fishing and hunting. Magellan discovered these islands in 1520 and named them from the numerous fires along the coast kept at night by the fishermen. Population, 1916, 2,162.

TIFFIN (tif'fin), a city in Ohio, county seat of Seneca County, on the Sandusky River, 35 miles southwest of Sandusky. It is on the Baltimore and Ohio, the Pennsylvania, and the Cleveland, Cincinnati, Chicago and Saint Louis railroads. Among the noteworthy buildings are the county courthouse, the high school, the public library, the Heidelberg University, and the Ursuline College. Other features include the Riverview Park and the soldiers' monument. It has manufactures of pottery, cigars, woolen goods, earthenware, machinery, glass, and farming implements. Tiffin was settled in 1819 and incorporated in 1850. Population, 1910, 11,894.

incorporated in 1850. Population, 1910, 11,894. TIFLIS (tye-flyes'), a commercial city of Russia, capital of Caucasia, on the Kur River. It has good railroad facilities and a large trade in raw and manufactured silk, cotton goods, carpets, dried fruits, and merchandise. Among the manufactures are cotton and silk goods, soap, leather, carpets, linens, machinery, and utensils. Electric lighting, rapid transit, telephones, waterworks, sewerage, and street pavements have been constructed under Russian engineers. The principal buildings include those occupied by the government, such as the grand ducal palace, the post office, and the townhall. It has a number of schools and institutions of secondary learning and several hospitals and scientific institutes. The architecture is a mixture of European and Asiatic plans of construction. A large number of the inhabitants are of Armenian, Georgian, or Persian descent. Tiflis was founded in the 5th century. It was destroyed in 1795 by Aga Mohammed Khan, Shah of Persia, and in 1801 became a part of Russia. Population, 1906, 161,520; in 1911, 198,140.

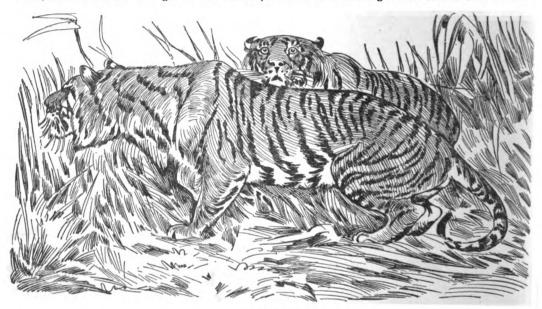
TIGER, a powerful carnivorous mammal of the cat family, about eight feet long and three to four feet high. An adult tiger weighs about 500 pounds. The front feet have five toes and the hind feet four, and all are characterized by strong retractile claws. The color is tawny yellow above and white beneath, with vertical black stripes on the body and black rings on the tail. It is able to swim with ease and frequently crosses rivers and inlets. The tiger is found in the region of Asia lying east of the Caucasus and south of central Siberia, but is most numerous in the swamps and grassy plains along the shores of great rivers, especially in India, Suma-

tra, and Java. Its voice is a loud grunting sound, being hardly comparable to the loud roar of the lion. It is very active and graceful and exercises fierce cunning in the capture of its prey.

Tigers lie in wait near the brook or other places frequented by animals, and spring forward with remarkable certainty to grasp and tear the prey to pieces. They are more feared by the natives than the lion, being more active and cunning. Bengal tigers are the best representatives of the species, and man-eating tigers are the old and nearly toothless specimens, finding man a favorite prey. The female is somewhat smaller than the male, and differs from it in not having a long growth of hair on the cheeks. Tigers are caught alive in various ways, but mostly by exposing a looking-glass within a room, near the door. A tiger on the outside,

745 until 727 B. C., was the most powerful of this dynasty. During his sway Babylonia was made a part of his realm and he sent expeditions against the Medians and Syrians. He is referred to in the Old Testament as Pul and it is related that he aided Ahaz, King of Judah (II. Kings xvi, 7). After his campaign in Palestine he proceeded to Babylonia to quell difficulties, and in 728 B. C. he was crowned as king of the Babylonians. He was succeeded by his son, Shalmaneser IV. See Assyria.

TIGRIS (ti'gris), the second river of Western Asia, which rises on the southern slope of the Anti-Taurus Mountains, near the upper course of the Euphrates. It receives the Bitlis River at Tilby and joins the Euphrates at Korna, about 100 miles from the Persian Gulf, the united streams being known as the Shat-el-Arab.



BENGAL TIGER.

seeing its image in the glass, is entitled into the room by thinking it another tiger, and is caught by a trapdoor dropping. The Romans caught tigers in large numbers and brought them to the gladiatorial fights in Rome.

TIGER CAT, the name commonly applied to any wild cat of large size, especially if it has some resemblance in form and markings to the tiger. The name is frequently given to the chati of South America, as well as to the serval and the ocelot. See Cat.

TIGLAT H-PILESER (tĭg'lath-pĭ-lē'zēr), the name applied in the Scriptures to several kings of Assyria. The first of these kings began to rule about 1120 B. C. Under this ruler the dominion of Assyria was enlarged by adding to it the region now embraced in Armenia, Kurdistan, Persia, Cappadocia, and a part of Syria. However, Tiglath-Pileser III., who reigned from

The general course of 1,175 miles is toward the southeast and almost parallel to the Euphrates, Mesopotamia lying between the two rivers. It is navigable for light freight-bearing steamers to Bagdad and for smaller vessels to Mosul. The upper course forms a rapid stream, bringing down large quantities of silt. It was the great channel for commercial navigation in ancient Assyria and on its banks were the cities of Nineveh, Ctesiphon, and Seleucia. The most important cities on the Tigris at present are Bagdad, Mosul, and Diarbekr.

TILDEN (til'den), Samuel Jones, statesman, born in New Lebanon, N. Y., Feb. 9, 1814; died Aug. 4, 1886. He studied at Yale University and the University of New York, but did not complete his course on account of ill health. Subsequently he was admitted to the New York bar, where he became famous as a corporation

counsel and amassed a large fortune. He was elected to the New York Legislature in 1845. During his term of office he became a leader in canal construction and other extensive improve-



SAMUEL J. TILDEN.

ments, and the following year was a member of the State constitutional convention. As a leader of the New York Democrats, he opposed the Tweed ring in 1871, and in 1874 was elected Governor of the State by 50,-000 majority, serving in that office until 1877. At that time the beautiful

State Capitol building at Albany was begun, which is considered one of the finest structures in America.

The Democrats nominated Tilden for President in 1876 against Governor Hayes of Ohio. At the election the country outside of South Carolina, Florida, and Louisiana gave the two candidates about the same number of electors, and the Democrats laid claim to a majority in these states. However, the Republicans claimed the election of Hayes, who was afterward seated by an electoral commission of fifteen named by Congress. The commission was constituted of eight Republicans and seven Democrats and by a strict party vote gave the decision in favor of the Republican candidate, admitting 184 votes for Tilden and 185 for Hayes. Of the popular votes as counted, Tilden received 4,284,265 and Hayes 4,033,295. Tilden became known as the Sage of Gramercy Park, continuing an influential adviser and prominent counsel, but declined the nomination for President in 1880 and 1884. He made a gift of \$4,000,000 at his death to found a free library in the city of New York, donating his private library of 15,000 volumes as a beginning. A number of heirs contested the will, though it had been drawn up by himself, and after long litigation a compromise was made in 1894 by which the gift was reduced to \$2,250,000. In 1895 the Astor and Lenox libraries were united with that established by Tilden, which is known as the New York Public Library with the Astor, Lenox, and Tilden Foundations. Tilden never married.

TILE, a flat or curved sheet of clay that has been baked for use in covering roofs and floors. Tiles are made for a variety of purposes and in construction differ vastly according to the use for which they are intended. Drain tiles are cylindrical, usually twelve inches long, but the larger sizes are two feet in length. Small tiles for draining, ranging from three inches to twelve inches in diameter, inside measurement, are made chiefly of clay, while large tiles, from fifteen

inches to three feet in diameter, are now made largely of concrete. Tiles used to cover floors are of a variety of colors and when worked to a special pattern they give a pleasing as well as durable effect. Roof tiles overlap each other like slates.

TILLMAN (til'man), Benjamin Ryan, public man, born in Edgefield County, South Carolina, Aug. 11, 1847. He received an elementary education at the time of the Civil War, but left school to join the Confederate army in 1864. After a severe illness, he lost his left eye and was an invalid for two years. After the war he engaged as a planter in his native State, and in 1886 became prominent as an advocate for reforms in technical and industrial affairs. He was elected Governor of South Carolina in 1890 and 1892, and in 1895 became a member of the United States Senate. He was reëlected in 1901 and 1907. In both houses of Congress he was on important committees. He founded Clemson Agricultural and Mechanical College at Fort Hill and Winthrop Normal and Industrial College at Rock Hill, the former for boys and the latter for girls. In 1895 he took part in the movement which led to the establishment of an educational qualification for suffrage in his State.

TILLY (til'li), John Tserclaes, Count of, eminent general, born in the chateau of Tilly, in Brabant, in February, 1559; died at Ingolstadt, Germany, April 30, 1632. He descended from German parents, who placed him under instruction by the Jesuits, but he preferred the life of a soldier and began his military career under the Spanish in the Netherlands. Subsequently he served against the Turks in Hungary, but in 1610 was appointed to a command in the imperial army of Germany under Maximilian I., and soon after the beginning of the Thirty Years' War became commander in chief of the military forces organized by the Catholic League. His efficient leadership and military skill won 36 consecutive battles. He subdued Bohemia in 1620 and Palatinate in 1622, and for his services was made count by Ferdinand II.

Tilly defeated Christian of Brunswick at Stadtlohn in 1623 and Christian IV. of Denmark at Lutter in 1626, compelling the latter to retire from Brunswick to his own country. Wallenstein was obliged to retire as commander of the imperial forces, in 1630, and was succeeded by Tilly, who stormed Magdeburg in 1631 and allowed his army of Walloons and Croats to perpetrate cruelties upon the unfortunate opponents. However, his success was at an end, being met by Gustavus Adolphus at Breitenfeld on Sept. 17, 1631, and completely routed by the Swedish army. He was compelled to retreat beyond the Lech River in Bavaria, and on April 5, 1632, was severely wounded in the desperate conflict on the Lech, from the effect of which he died after being removed to Ingolstadt. Tilly ranks among the greatest military leaders of the 17th century, being efficient as a commander and popular among his soldiers. His zeal for military success was not exercised because he desired personal power or aggrandizement, but on account of his devotion to Catholi-

TILSIT (til'sit), a city of Germany, in the province of East Prussia, 60 miles northeast of Königsberg. It is finely located on the Niemen River, has good railroad facilities, and is surrounded by a fertile fruit-growing and farming country. Among the manufactures are leather, glass, clothing, and lumber. It has a considerable trade in lumber, grain, and dairy products. The river is navigable beyond the city. Tilsit is celebrated for the treaty concluded here in July, 1807, by which Prussia lost much territory. The city was captured and lost by the Russians in 1914. Population, 1914, 41,865.

TIMBER. See Lumber.

TIMBUCTOO (tim-buk'too), or Tembuktu, a trade center in the Sudan, near the southern boundary of the Sahara, seven miles north of the Niger. It occupies a site only slightly elevated above the river, and the region between it and the main channel of the Niger is frequently flooded, thus leaving a number of channels and bayous in the sandy wastes. Walls formerly surrounded the city, but they are now in ruins and almost totally destroyed. Most of the buildings are low and constructed of clay, but it has several fine architectural structures, among them the Mosque of Sankore, the Great Mosque, and several structures erected by the French, whose sphere of influence extends throughout the region. Timbuctoo owes its importance to its situation near the Niger, since reaching that stream near the city is an object sought by the many caravans passing between the Mediterranean and the Gulf of Guinea, and between the Atlantic and the interior of Northern Africa. The city was founded in the 11th century and the Great Mosque dates from 1325. Among the articles of trade are ivory, tobacco, ostrich feathers, gold dust, salt, tea, cutlery, and fruits. The inhabitants include Arabs, Tuaregs, Mandingoes, Jews, Africans, and Fulahs. French occupation has greatly increased the importance of Timbuctoo as a market. Population, 1916, 12,480.

TIME, Standard. See Standard Time. TIMOR (te-mor'), an island of the Malay

TIMOR (tė-mōr'), an island of the Malay Archipelago, the largest of the Lesser Sunda Islands. It is situated southeast of Celebes, about 700 miles east of Java. The length is 280 miles; average breadth, 55 miles; and area, 12,-375 square miles. It is traversed by a range of lofty mountains, some of which are volcanic, but it has a large area of fertile land. The highest summits approximate 11,800 feet, but the slopes are well wooded. Among the chief products are sugar, rice, sago, indigo, fruits, pearl oysters, buffaloes, and sandalwood. The inhabitants are thiefly Malayans, but are mixed more or less with Negroes. Politically the island is divided between Holland and Portugal. The Dutch pos-

sess the southwestern half with the capital at Kupang, while the Portuguese have the northeastern half with their seat of government at Deli. Nearly all of the Europeans reside in the portion controlled by Holland. The total popu-

lation is given at 400,000.

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TIMORLAUT (tê-mōr'lout), a Greek group of islands in the Malayan Archipelago, situated 240 miles southeast of Ceram, one of the Molucas. Yamdena, Larat, and Selaru are the largest islands of the group. Though of volcanic origin, some of the islands are partly of coral formation. The total area is 2,060 square miles. Most of the inhabitants are a mixture of Malayans and Negritos. They engage in trepang fishing, agriculture, and stock raising. These islands are noted for numerous brilliantly colored birds.

Population, 24,950.

TIMOTHY (tim'o-thy), or Timotheus, a disciple of Paul, born in Lycaonia, Asia, of a Greek father and a Jewish mother. He became converted to Christianity at the time Paul visited Lystra and afterward accompanied the apostle to Philippi, Athens, Thessalonica, Rome, Ephesus, and other cities. He served on important missions in connection with the preaching of Paul. His name and that of Paul are associated in the opening of the Second Epistle to the Corinthians, both epistles to the Thessalonians, and those addressed to the Colossians and Philippians. His death, which is commemorated on Jan. 24, occurred in the reign of Domitian. Paul addressed the two Epistles to Timothy to him. These two books of the New Testament and that of Titus are called the Pastoral Epistles. According to tradition, Timothy was the first bishop of Ephesus, and it is asserted that he suffered martyrdom under Domitian.

TIMOTHY GRASS, a species of grass widely cultivated, which is one of the most valuable for hay. It was named timothy from Timothy Hanson, who did much to promote its cultivation in America, after it had been introduced from Europe. The seed is usually sown along with wheat, rye, or some other cereal, as a means of protecting the young plants, and the grass becomes fit for cutting the second year. It attains a height of three to five feet, is tender and nutritious, and yields one to three tons of hay per acre. The stems are cylindrical and the flowers form a seeming spike. Timothy is a perennial plant. It comprises the greater part of the hay crop of the United States, and is grown extensively in Canada, especially in Ontario, but it taxes the soil more than clover. In England it is generally known as herd's grass. It requires considerable moisture early in the spring to

develop a good crop.

TIMUR (ti-moor'), Timur-Beg, Timour, or Tamerlane, celebrated conqueror of Central Asia, born at Kesh, 40 miles southeast of Samarkand, April 9, 1336; died Feb. 18, 1405. He was the son of a Turkish chief, but by his mother descended from Genghis Khan, and his educa-

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